CITGO Petroleum Corporation

P.O. Box 4689
Houston, TX 77210-4689

CERFIFIED MAIL RETURN RECEIPT REQUESTED
7011 1570 0003 0286 8182

February 23, 2012

Chief
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611, Ben Franklin Station
Washington, DC 20044-7611
Reference Case No. 90-5-2-1-07277

RECEIVED
FEB 28 2012
AIR ENFORCEMENT BRANCH
U.S. EPA REGION 5

Re: Semi-Annual Report
Report Covering Period July 1, 2011 – December 31, 2011
CITGO Petroleum Corporation
Civil Action Number H-04-3883
Southern District of Texas, Consent Decree entered January 26, 2005

Dear Chief:

Pursuant to Section IX of the referenced Consent Decree, CITGO is submitting the Semi-Annual Report for the 2nd half of 2011 for the Covered Refineries. The Covered Redineries include the Corpus Christi East Refinery, the Corpus Christi West Refinery, the Lake Charles Refinery, and the Lemont Refinery. The Paulsboro and Savannah Refineries are owned and operated by NuStar Asphalt Refining, LLC. Semi-annual reports for these facilities are submitted by CITGO Petroleum Corporation. This report covers the period from July 1, 2011 through December 31, 2011.

The Semi-Annual Report consists of individual reports for each of the Covered Refineries, and therefore six reports are enclosed. Each individual report consists of a spreadsheet listing each applicable Consent Decree topic, Paragraph reference, due date, submittal or completion date, a description of the requirement, and comments detailing compliance status. The spreadsheet also addresses the requirements of Paragraph 144, Section IX, and includes designation of the applicable section of Paragraph 144 for which the information is being reported. This designation appears in the report spreadsheet column labeled "¶ 144 Reporting (a. – e.)". Attachments are also used to provide additional information.

A complete set of the six reports is being provided to EPA Headquarters. Copies of the appropriate individual refinery reports are being provided to the Applicable EPA Regions and Applicable State Agencies as described in Section XVII and additions requests from EPA and Illinois EPA.

I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the

information submitted. Based on my direction and my inquiry of the person(s) who manage the system, or the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

If you have any questions, or require additional information, please contact me at 832-486-4903.

Sincerely,

David Hollis

David Hollis
Manager Environmental Services

Enclosures

Copies per Section XVII, Paragraph 270:

Covered Refineries

Certified # 7011 1570 0003 0286 8175
U.S. Environmental Protection Agency
Director, Air Enforcement Division
Office of Civil Enforcement
Ariel Rios Building, Mail Code 2242-A
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460-0001

Manager, Environmental Services
CITGO
1293 Eldridge Parkway
Houston, TX 77077

General Counsel
CITGO
1293 Eldridge Parkway
Houston, TX 77077

Matrix New World Engineering Inc. *(via email only)*

Sharon Braby of EPA *(via email only)*

Lake Charles Refinery

Certified # 7011 1570 0003 0286 8199
Chief
Air, Toxics, and Inspections Coordination Branch
Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

Certified # 7011 1570 0003 0286 8205
Peggy M. Hatch
Administratior, Enforcement Division
Office of Environmental Compliance
Louisiana Department of Environmental Quality
P.O. Box 4312
Baton Rouge, LA 70821-4312

Lemont Refinery

Certified # 7011 1570 0003 0286 8212
Air and Radiation Division
U.S. EPA, Region 5
ATTN: Compliance Tracker
77 West Jackson Blvd. (AE-17J)
Chicago, IL 60602-3018

Certified # 7011 1570 0003 0286 8267
The State of Illinois
Office of the Illinois Attorney General
69 W. Washington St, 18th Floor
Chicago, IL 60602

Certified # 7011 1570 0003 0286 8229
Office of Regional Counsel
U.S. EPA, Region 5
77 West Jackson Blvd. (C-14J)
Chicago, IL 60604

Certified # 7011 1570 0003 0286 8243
Manager
Air Compliance Unit
Compliance and Enforcement Setion (MC-40)
Bureau of Air
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, IL 62794-9276

Certified # 7011 1570 0003 0286 8250
Manager
Permit Section (MC-11)
Division of Air Pollution Control
Illinois Environmental Protection Agency
P.O. Box 19506
Springfield, IK 62794-9506

Certified # 7011 1570 0003 0286 8236
Manager
Air Regional Field Office
Division of Air Pollution Control
Illinois Environmental Protection Agency
9511 West Harrison
Des Plaines, IL 60016

Corpus Christi East Refinery and Corpus Christi West Refinery

Certified # 7011 1570 0003 0286 8281
Chief
Air, Toxics, and Inspections Coordination Branch
Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

Savannah Refinery

Certified # 7011 1570 0003 0286 8298
Chief, Air Enforcement & EPCRA Branch
Air, Pesticides and Toxics Management Division
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, S.W.
Atlanta, GA 30303

Certified # 7011 1570 0003 0286 8304
Chief
Air Protection Branch
Environmental Protection Division
4244 International Parkway, Suite 120
Atlanta, GA 30354

Paulsboro Refinery

Certified # 7011 1570 0003 0286 8311
Director, Division of Enforcement and Compliance Assistance
U.S. Environmental Protection Agency, Region 2
21st Floor
290 Broadway
New York, NY 10007

Certified # 7011 1570 0003 0286 8328
Chief, Air Compliance Branch
Division of Enforcement and Compliance Assistance
21st Floor
290 Broadway
New York, NY 10007

Certified # 7011 1570 0003 0286 8385
New Jersey Department of Environmental Protection
Southern Regional Office
Air Compliance & Enforcement Manager
One Port Center
2 Riverside Drive, Suite 201
Camden, NJ 08103

bc:

Lee Liebendorfer – Lake Charles report
Mark Cheesman – Corpus Christi reports
Claude Harmon – Lemont report
Janet Ferris – Paulsboro report
Dusty Crisler – Savannah report
Chris Newcomb – Legal
File: Semi-Annual Report, IX, 02-2011

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CITGO Petroleum Corporation

Lemont Refinery

Semi-Annual Report

July 1, 2011 – December 31, 2011

Reference Case No. 90-5-2-1-07277

CITGO Petroleum Corporation
Lemont Refinery
Semi-Annual Report
July 1, 2011 – December 31, 2011

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CITGO Petroleum Corporation
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Executive Summary

Pursuant to Section IX of the CITGO Petroleum Corporation Consent Decree (Civil Action Number H-04-3883 - Southern District of Texas) entered January 26, 2005, CITGO is submitting the Semi-Annual Report for the second half of 2011 for the Lemont Refinery in Lemont, Illinois. This report covers the period from July 1, 2011 through December 31, 2011.

The Semi-Annual Report consists of:

- A spreadsheet listing each applicable Consent Decree topic, Paragraph reference, due date, submittal or completion date, a description of the requirement, and comments detailing compliance status. The spreadsheet also addresses the requirements of Paragraph 144, Section IX, for each applicable Consent Decree paragraph and includes designation of the applicable section of Paragraph 144 for which the information is being reported. This designation appears in the report spreadsheet column labeled "¶ 144 Reporting (a. – e.)."

- A set of attachments that are used to provide additional information.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
FCCU	12	Effective January 26, 2005	January 26, 2005 and Ongoing	Operate, calibrate and certify CEMS for NOx, O2,SO2,CO and opacity at FCCU. The CEMS shall be installed, calibrated and certified in accordance with 40 CFR 60.13 and Part 60 Appendices A and F, and the applicable performance specification test of 40 CFR Part 60 Appendix B.	a.	Complied with requirement.
FCCU	12	Effective December 31, 2007	December 31, 2007 and Ongoing	Operate, calibrate and certify PEMS for opacity at FCCU. The PEMS shall be operated, calibrated and certified in accordance with the approved alternative monitoring plan.	a.	Complied with requirement.
FCCU	12	Effective January 26, 2005	January 26, 2005 and Ongoing	For O2, SO2, NOx, and CO CEMS: In lieu of the requirements of 40 C.F.R. Part 60, Appendix F §§ 5.1.1, 5.1.3, and 5.1.4, may conduct: (1) either a Relative Accuracy Audit ("RAA") or a Relative Accuracy Test Audit ("RATA") once every three (3) years; and 2) a Cylinder Gas Audit ("CGA") each calendar quarter in which a RAA or RATA is not performed.	a.	Complied with requirement. CGA conducted third and fourth quarters. A RATA was performed on the FCCU O2, SO2, NOx, and CO CEMS during the fourth quarter.
FCCU	21	Effective December 31, 2007	December 31, 2007 and Ongoing	Convert the FCCU to full burn operation or accept and agree to comply with concentration based emission limit of 20 ppmvd on a 365-day rolling average and 40 ppmvd on a 7-day rolling average basis, both at 0% oxygen.	a.	Complied with Emisson Limit Option at Paragraphs 30A; this explicitly absolves CITGO of any remaining obligations for the Lemont Refinery FCCU under Pargaraphs 13 through 30 of the Consent Decree requirement.
FCCU	31	Effective December 31, 2007	December 31, 2007 and Ongoing	Use NOx and O_2 CEMS to monitor performance and to report compliance.	a. & b.	Performance monitored. See **Attachment 1.**
FCCU	41	Effective January 26, 2005	January 26, 2005 and Ongoing	Use SO2 and O_2 CEMS to monitor performance and to report compliance.	a. & b.	Performance monitored. See **Attachment 1.**
FCCU	44a	Effective December 31, 2007	December 31, 2007 and Ongoing	Install and commence operation of a WGS designed to achieve an emission limit of 0.5 pounds of PM per 1000 pounds of coke burned on a 3-hour average basis.	a. & b.	Complied with requirement.
FCCU	46	Effective December 31, 2007	December 31, 2007 and Ongoing	Comply with an emission limit of 1.0 pounds of PM per 1000 pounds of coke burned on a 3-hour average basis .	a., b. & d.	Complied with requirement based on the most recent Performance Test, October 2011. Test showed 0.27 lb PM/1000 lb coke burn.
FCCU	47	Initially 3/31/2008 and Annually Thereafter	March 18, 2008	Conduct annual PM stack tests.	a. & d.	Complied with requirement. Most recent stack test completed October 2011. Next stack test due 4Q 2012.
FCCU	48	Effective January 26, 2005	January 26, 2005 and Ongoing	Comply with 100ppmvd CO corrected to 0% O2 on a 365-day rolling average basis and 500ppmvd CO corrected to 0% O2 on a 1-hour average basis at FCCU.	a. & b.	Complied with requirement. See **Attachment 1.**
FCCU	50	Effective January 26, 2005	January 26, 2005 and Ongoing	Beginning on the dates set forth in Paragraph 12, shall use CO and O2 CEMS to monitor performance and report compliance with terms and conditions of Consent Decree.	a. & b.	Complied with requirement. See **Attachment 1.**
FCCU	51	Effective January 26, 2005	January 26, 2005 and Ongoing	FCCU Regenerator shall be an "affected facility" per NSPS Subparts A & J. Comply with requirements of NSPS Subparts A & J for CO on FCCU.	a., b. & d.	Complied with requirement. See **Attachment 1.**

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
FCCU	51	Effective December 31, 2007	December 31, 2007 and Ongoing	FCCU Regenerator shall be an "affected facility" per NSPS Subparts A & J. Comply with requirements of NSPS Subparts A & J for SO2 on FCCU.	a., b. & d.	Complied with requirement. See **Attachment 1**.
FCCU	51	Effective December 31, 2007	December 31, 2007 and Ongoing	FCCU Regenerator shall be an "affected facility" per NSPS Subparts A & J. Comply with requirements of NSPS Subparts A & J for PM on FCCU.	a., b. & d.	Complied with requirement based on the most recent Performance Test, October 2011. Test showed 0.27 lb PM/1000 lb coke burn.
Heaters & Boilers	56	Initial submittal by March 31, 2005 and Annually thereafter by February 28 of each year	February 28, 2006 and by February 28 of each year thereafter	Shall submit a detailed NOx Control Plan ("Control Plan") to EPA for review and comment by no later than March 31, 2005, with annual updates (covering the prior calendar year) with the first report submitted pursuant to Section IX (Record-keeping and Reporting) following the passage of each calendar year until termination of the Consent Decree or until the reductions required by Paragraph 54 are achieved, whichever occurs first. The Control Plan and its updates shall describe the achieved and anticipated progress of the NOx emissions reductions program for heaters and boilers and shall contain the information requested in this Paragraph.	a., b. & e.	Complied with requirement. See **Attachment 2**. This is the final annual update of the plan, as this reflects the installation and testing of all Required Qualifying Controls.
Heaters & Boilers	57	June 30, 2011	June 30, 2011	Consistent with Paragraph 54, CITGO shall install the remainder of the required Qualifying Controls by no later than June 30, 2011	a.	All Required Qualifying Controls installed per Appendix C.
Heaters & Boilers	59	September 30, 2005	September 30, 2005 and Ongoing	By no later than September 30, 2005, CITGO shall implement the specified monitoring requirements (CEMS, PEMS, stack test) based on the capacity of the heaters or boiler as listed in Appendix C for units that utilize Qualifiying Controls as of the Date of Lodging and which CITGO intends to use to achieve the NOx reductions required by Paragraph 54.	a.	Complied with requirement. Paragraph 59a requires the use of CEMS for heaters and boilers with a capacity greater than 150 MMBtu/hr. Stack test for the Qualifying Controls installed May 2011 (on 2 heaters < 150 MMBtu/hr) was conducted October 2011.
Heaters & Boilers	60	September 30, 2005	September 30, 2005 and Ongoing	Shall install, certify, calibrate, maintain, and operate the CEMS required by Paragraph 59 in accordance with 40 C.F.R. Part 60, Appendices A and F, and the applicable performance specification test of 40 C.F.R. Part 60, Appendix B. However, in lieu of the requirements of 40 C.F.R. Part 60, Appendix F §§ 5.1.1, 5.1.3 and 5.1.4, CITGO may conduct either a Relative Accuracy Audit ("RAA") or a Relative Accuracy Test Audit ("RATA") once every three (3) years and shall conduct Cylinder Gas Audits ("CGA") each calendar quarter during which a RAA or a RATA is not performed.	a.	Complied with requirement. CGA conducted each calendar quarter during which a RAA or a RATA is not performed.
Heaters & Boilers	64a	Effective January 26, 2005	January 26, 2005 and Ongoing	Comply with NSPS requirements of Subparts A and J for fuel gas combustion devices except those listed in Appendix E of Consent Decree.	a., b., & d.	Complied with requirement except as noted in **Attachment 3**.
Heaters & Boilers	64a	Effective July 31, 2005	July 31, 2005 and Ongoing	Heaters and boilers listed in Appendix E shall be an "affected facility" and shall be subject to and comply with the requirements of NSPS Subparts A and J for fuel gas combustion devices by the dates listed in Apppendix E.	a.	Complied with requirement.
Heaters & Boilers	64a	Effective October 31, 2005	October 31, 2005 and Ongoing	Heaters and boilers listed in Appendix E shall be an "affected facility" and shall be subject to and comply with the requriements of NSPS Subparts A and J for fuel gas combustion devices by the dates listed in Apppendix E.	a.	Complied with requirement.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
Heaters & Boilers	65	Effective January 26, 2005	January 26, 2005 and Ongoing	Discontinue use of fuel oil in any combustion unit except for periods of Natural Gas Curtailment. Nothing herein is intended to limit, or shall be interpreted as limiting, the use of torch oil during FCCU Startups.	a. & d.	Complied with requirement. Further, this paragraph is not intended to be interpreted to limit the use of torch oil in an FCCU regenerator to assist in starting, restarting, maintaining hot standby, or maintaining regenerator heat balance.
SRP	67b	Effective January 1, 2009	January 1, 2009 and Ongoing	NSPS Subparts A & J applicable to Claus Trains A and B.	a.	Complied with requirement.
SRP	67c	Effective January 26, 2005	January 26, 2005 and Ongoing	NSPS Subparts A & J applicable to Claus Trains C and D.	a.	Complied with requirement.
SRP	68a	Effective January 1, 2009	January 1, 2009 and Ongoing	Claus Trains A & B must comply with provisions applicable under NSPS Subparts A & J.	a.	Complied with requirement.
SRP	68a	Effective January 26, 2005	January 26, 2005 and Ongoing	Claus Trains C & D must comply with provisions applicable under NSPS Subparts A & J.	a.	Complied with requirement.
SRP	68b	Effective January 1, 2009	January 1, 2009 and Ongoing	Monitor all tail gas emission points (stacks) and report excess emissions from each SRP pursuant to 40 CFR 60.7(c), 60.13 and 60.105(a)(6). Trains A & B.	a. & b.	Complied with requirement except as noted in **Attachment 4**.
SRP	68b	Effective January 26, 2005	January 26, 2005 and Ongoing	Monitor all tail gas emission points (stacks) and report excess emissions from each SRP pursuant to 40 CFR 60.7(c), 60.13 and 60.105(a)(6). Trains C & D.	a. & b.	Complied with requirement except as noted in **Attachment 4**.
SRP	69a	Effective January 1, 2009	January 1, 2009 and Ongoing	Install one or more TGU(s) to control emissions from Claus Trains 119 A and B.	a.	Complied with requirement.
SRP	73a	February 28, 2005	February 28, 2005 and Ongoing	Summarize and report changes to the Preventative Maintenance and Operaton Plan (PMO) in semi-annual report.	a. & e.	Complied with requirement. See **Attachment 5** for summary of changes.
HC Flaring	74	Effective January 26, 2005	January 26, 2005 and Ongoing	Implement good air pollution control practices to minimize emissions from flare devices.	a.	Complied with requirement.
HC Flaring	75a.i.	Effective January 26, 2005	Effective January 26, 2005	Flares 844C-1, 844C-2, 844C-3 and 844C-4 must meet requirements of NSPS Subparts A & J by option (i) operating and maintaining a flare gas recovery system to prevent continuous or routine combustion in the NSPS HC flaring device.	a.	Flares 844C-1, 844C-2, 844C-3, and 844C-4 are equipped with flare gas recovery systems. Other than when the Flare gas recovery system for C-2 and C-3 was down for maintenance, and when that compressor was shutdown to repair a line leak, all systems were operated throughout the reporting period.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
HC Flaring	76a	Effective January 26, 2005	January 26, 2005 and Ongoing	For continuous or intermittent, routinely-generated refinery gases that are combusted in any of the NSPS Hydrocarbon Flaring Devices, CITGO shall comply with the emission limit at 40 C.F.R 60.104(a)(1) by the dates specifed in Appendix G.	a.	Complied with requirement. Flares 844C-1, 844C-2, 844C-3, and 844C-4 are equipped with flare gas recovery systems, and combusted gases only associated with refinery process unit startups and shutdowns as well as other refinery malfunctions. These flares do not combust continuous or intermittent routinely generated gases, unless other refinery equipment malfunctions. Flare 844C-5 is dedicated to a HF alkylation unit, is not equipped with flare gas recovery, and sees routinely generated gases. The Alternative Monitoring Program (AMP) conducted in 2005-6 for various 844C-5 flare gas scenarios showed no H_2S. Also, per 40CFR 60.105(a)(4)(iv)(C), fuel gas produced at HF alkylation units is inherently low in sulfur and does not require monitoring for H_2S.
HC Flaring	76b	Effective January 26, 2005	January 26, 2005 and Ongoing	The combustion of gases generated by the Startup, Shutdown, or Malfunction of a refinery process unit or released to an NSPS Flaring Device as a result of relief valve leakage or other emergency Malfunction are exempt for the requirements to comply with 40C.F.R. 60.104(a)(1).	a.	Complied with requirement. During the reporting period flares 844C-1, 844C-2, 844C-3, and 844C-4, all equipped with flare gas recovey systems, combusted gases associated with refinery process unit startups and shutdowns as well as other refinery malfunctions.
AG Flaring/Tail Gas Incident	78	Effective January 26, 2005	January 26, 2005 and Ongoing	Investigate Acid Gas Flaring and Tail Gas Incidents, correct conditions that caused incident, and minimize incidents.	a.	No Tail Gas or Acid Gas Incident occurred during reporting period.
AG/TG Flaring	79	45 days following the end of an acid gas flaring incident	N/A	No later than 45 days following the end of an Acid Gas Flaring Incident, an investigative report shall be submitted.	a.	No Acid Gas Incident occurred during reporting period.
AG Flaring/Tail Gas Incident	79	45 days following the end of a Tail Gas Incident	N/A	No later than 45 days following the end of a Tail Gas Incident, an investigative report shall be submitted.	a.	No Tail Gas Incident occurred during reporting period.
AG Flaring/Tail Gas Incident	80a	Effective January 26, 2005	N/A	Take corrective actions to minimize likelihood of a recurrence of the Root Cause and all significant contributing causes of AG Flaring Incident.	a.	No Acid Gas Incidents occurred during reporting period.
AG Flaring/Tail Gas Incident	80a	Effective January 26, 2005	N/A	Take corrective actions to minimize likelihood of a recurrence of the Root Cause and all significant contributing causes of Tail Gas Incident.	a.	No Tail Gas Incidents occurred during reporting period.
AG Flaring/Tail Gas Incident	80b	Effective January 26, 2005	N/A	If EPA does not notify CITGO in writing within 45 days of receipt of reports required by Paragraph 79 that it objects to proposed corrective actions and schedules, then those actions and schedules shall be deemed acceptable for compliance with Paragraph 80a.	a.	No Acid Gas Incidents occurred during reporting period.
AG Flaring/Tail Gas Incident	80b	Effective January 26, 2005	N/A	If EPA does not notify CITGO in writing within 45 days of receipt of reports required by Paragraph 79 that it objects to proposed corrective actions and schedules, then those actions and schedules shall be deemed acceptable for compliance with Paragraph 80a.	a.	No Tail Gas Incidents occurred during reporting period.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
AG Flaring/Tail Gas Incident	80c.	Effective January 26, 2005	N/A	If EPA objects to the proposed corrective actions and/or schedule of implementation, it shall notify CITGO and explain basis, and CITGO shall respond promptly to EPA's objection.	e.	No Acid Gas Incidents occurred during reporting period.
AG Flaring/Tail Gas Incident	80c.	Effective January 26, 2005	N/A	If EPA objects to the proposed corrective actions and/or schedule of implementation, it shall notify CITGO and explain basis, and CITGO shall respond promptly to EPA's objection.	e.	No Tail Gas Incidents occurred during reporting period.
AG/TG Flaring	93a	Effective January 26, 2005	N/A	For Tail Gas Incidents, CITGO shall follow the same investigative, reporting, corrective action and assessment of stipulated penalty procedures as those set forth in Paragraphs 79 through 91 for Acid Gas Flaring Incidents. No later than 45 days following the end of a Tail Gas Incident, an investigative report shall be submitted.	a.	No Tail Gas Incidents occurred during reporting period.
HC Flaring	94	Effective January 26, 2005	Each Semi-Annual Report	Hydrocarbon Flaring Incidents shall be investigated, reported, and corrective action taken, according to paragraphs 79 - 80 with certain exceptions. Investigative report to be completed within 45 days following incident. Investigative report to be submitted as part of Semi-Annual Report.	a. & e.	Hydrocarbon incidents occurred July 25, 2011, August 12, 2011, and September 13, 2011. See **Attachment 6.**
BWON	96a	Effective January 26, 2005	January 26, 2005 and Ongoing	Comply with 6BQ Compliance Option.	a.	Complied with requirement. YTD BQ is below 6 Mg.
BWON	101a	Effective January 26, 2005	January 26, 2005 and Ongoing	Continue to use primary and secondary carbon canisters as control device under Benzene Waste NESHAP and operate them in series where such systems are in use as of January 26, 2005. Maintain a complete, accurate and up to date list which includes location of the canisters and whether VOC or benzene is used to monitor for breakthrough.	a.	Complied with requirement.
BWON	101b	Effective January 26, 2005	January 26, 2005 and Ongoing	For carbon canisters, do not use single carbon canisters for any new units or installations requiring controls.	a.	Complied with requirement.
BWON	101c	Effective January 26, 2005	January 26, 2005 and Ongoing	For dual carbon canister systems, breakthrough between the primary and secondary canister is equal to or greater than 50 ppm volatile organic compounds (VOC).	a.	Complied with requirement.
BWON	101d	Effective January 26, 2005	January 26, 2005 and Ongoing	Monitor for breakthrough between the primary and secondary carbon canisters monthly.	a.	Complied with requirement.
BWON	101e	Effective January 26, 2005	January 26, 2005 and Ongoing	The original carbon canister shall be replaced immediately when breakthrough is detected between the primary and secondary canister. Immediately means within twelve hours for canisters 55 gallons and less and within twenty four hours for canisters greater than 55 gallons.	a.	Complied with requirement.
BWON	101f	October 31, 2004	N/A	Monitor for breakthrough on temporary carbon canisters each day canister is in use.	a.	No temporary applications used during period.
BWON	101g	Effective January 26, 2005	January 26, 2005 and Ongoing	Maintain a readily available supply of fresh carbon canisters to implement "immediate" change-out when breakthrough occurs.	a.	Complied with requirement.
BWON	101h	Effective January 26, 2005	January 26, 2005 and Ongoing	Maintain records for carbon canisters, which includes monitor readings and constituents being monitored for at least five years.	a.	Complied with requirement. Records maintained in LDAR database.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
BWON	102	May 31, 2005	May 31, 2005 and Ongoing	Establish or modify a written management of change procedure to provide for annual review of process information relating BWON waste streams.	a.	Complied with requirement.
BWON	102	Effective May 31, 2005	May 31, 2005 and Annually, thereafter	Per BWON Management of Change Procedures, conduct an annual review of process information, including construction projects, to locate new benzene waste streams for inclusion into the waste stream inventory.	a.	Complied with requirement.
BWON	103a	Effective September 30, 2005	September 30, 2005 and ongoing	Conduct initial audits of laboratories that perform analyses of BWON samples.	a.	No initial laboratory audits conducted this reporting period. Initial laboratory audits were conducted August and September 2005.
BWON	103c	Effective September 30, 2007	September 30, 2007 and ongoing	Conduct subsequent audits of laboratories that perform analyses of BWON samples such that each laboratory is audited every two years.	a.	Complied with requirement. Audits were completed during this reporting period. See **Attachment 7, Appendix A** for summaries of audits.
BWON	104	Effective January 26, 2005	September, 2005 and every 2 yrs thereafter	Review all spills to determine if any benzene waste was generated. Any release of more than 10 pounds in a 24 hour period shall be included in the TAB and BQ.	a.	Complied with requirement.
BWON	105a	Effective May 31, 2005	N/A	Develop and begin implementation of annual training for employees who draw benzene waste samples for BWON purposes.	a.	No refinery employees are involved in drawing benzene waste samples for BWON purposes.
BWON	105b	Effective December 31, 2005	December 31, 2005 and Ongoing	Shall complete an initial training program on the standard operating procedures for all control devices and treatment processes used to comply with the Benzene Waste NESHAP for all operators assigned to applicable control devices and treatment processes. Comparable training shall also be provided to any persons who subsequently become operators, prior to their assumption of this duty.	a.	Complied with requirement.
BWON	105d	May 31, 2005	May 31, 2005 and Ongoing	CITGO shall assure that the employees of any contractors hired to perform any of the requirements of Section V.L of this Consent Decree (i.e., Benzene Waste NESHAP Program Enhancements) are properly trained to implement such requirements that they are hired to perform, as under Paragraph 105.a and b above.	a.	Complied with requirement. See explanations in Paragraph 112b.
BWON	107c	4th Quarter 2005	4th Quarter 2005 and Ongoing	Begin sampling under the EOL plan.	a.	Complied with requirement.
BWON	109	To be initiated in 4th Quarter 2005	Initiated in 4th Quarter 2005 and Ongoing	At the end of the calendar quarter following commencement of quarterly sampling, calculate a quarterly uncontrolled benzene quantity and estimate a projected calendar year uncontrolled benzene quantity based on quarterly EOL sampling results, non-EOL sampling results and approved flow calculations.	a.	Complied with requirement. **See Attachment 7.** Based on 3rd & 4th Q EOL sampling, BQ estimate for 2011 is 1.86 MT.
BWON	111d	Effective January 26, 2005	Effective January 26, 2005	Conduct quarterly monitoring and repair of the oil water separators .	a.	Complied with requirement.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
BWON	112a	Effective Semi-annually after intitial audit	Semi-Annually	Submit to EPA information in the progress report(s) pursuant to Paragraph 144 for the six month period covered by the report. An identication of all laboratory audits, if any, completed during the six month period, including a description of the methods used in the audit and the results of the audit.	a. & e.	Two laboratory audits for the BWON program were performed during this reporting period. See **Attachment 7, Appendix A** for requested information.
BWON	112b	Effective May 31, 2005	May 31, 2005 and Semi-annually, thereafter	Submit to EPA information in the progress report(s) pursuant to Paragraph 144 for the six month period covered by the report: A description of the measures taken, if any, during the six month period to comply with the training provisions of Paragraph 105. Paragraph 105a states: Provide annual (i.e., once each calendar year) training for all employees who draw benzene waste samples for Benzene Waste NESHAP purposes.	a. & e.	Employees do not draw samples for BWON purposes.
BWON	112b	Effective December 31, 2005 (See Paragraph 105b)	Semi-Annually	Submit to EPA information in the progress report(s) pursuant to Paragraph 144 for the six month period covered by the report: A description of the measures taken, if any, during the six month period to comply with the training provisions of Paragraph 105. Paragraph 105b states: Shall complete an initial training program on the standard operating procedures for all control devices and treatment processes used to comply with the Benzene Waste NESHAP for all operators assigned to applicable control devices and treatment processes. Comparable training shall also be provided to any persons who subsequently become operators, prior to their assumption of this duty.	a. & e.	Complied with requirement.
BWON	112b	Effective December 31, 2005	Semi-Annually	Submit to EPA information in the progress report(s) pursuant to Paragraph 144 for the six month period covered by the report: A description of the measures taken, if any, during the six month period to comply with the training provisions of Paragraph 105. Paragraph 105 d states: CITGO shall assure that the employees of any contractors hired to perform any of the requirements of Section V.L of this Consent Decree (i.e., Benzene Waste NESHAP Program Enhancements) are properly trained to implement such requirements that they are hired to perform, as under Paragraph 105.a and b above.	a. & e.	Contractors received training on November 8, 2011. Training entailed a detailed review of USEPA Method 25A and EOL Plan for BWON Sampling.
BWON	112c	Effective January 26, 2005	Semi-Annually	Submit to EPA information in the progress report(s) pursuant to Paragraph 144 for the six month period covered by the report: A summary of the sampling results required under Paragraphs 107, including the quarterly and projected annual uncontrolled benzene quantities or TABs, as applicable.	a. & e.	3rd & 4th Q BWON EOL calculations performed. See **Attachment 7**. Based on the 3rd & 4th Q BWON EOL values, BQ estimate for 2011 is 1.86 MT.
LDAR	115	Effective April 30, 2005	Semi-Annually	Develop and maintain a written program for compliance with applicable federal and state LDAR regulations.	a.	Complied with requirement.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
LDAR	116a	May 31, 2005	May 31, 2005 and Ongoing	For personnel newly-assigned to LDAR responsibilities, require training prior to each employee beginning such work.	a.	Complied with requirement.
LDAR	116b	September 30, 2005	September 30, 2005 and Ongoing	Complete required initial annual training for all personnel assigned LDAR responsibilities.	a.	Complied with requirement.
LDAR	116b	Effective September 30, 2005	September 30, 2005 and Annually thereafter	For all personnel assigned LDAR responsibilities, shall provide and require completion of annual LDAR training.	a.	Complied with requirement. System in place for next required annual training.
LDAR	116c	September 30, 2005	September 30, 2005 and Ongoing	Complete required initial annual training for all other operations and maintenance personnel (including contract personnel) that includes instruction on aspects of LDAR that are relevant to the person's duties.	a.	Complied with requirement.
LDAR	116c	Effective September 30, 2005	September 30, 2005 and Annually thereafter	For all other operations and maintenance personnel (including contract personnel), shall provide and require completion of annual "Refresher" training that includes instruction on aspects of LDAR that are relevant to the person's duties.	a.	Complied with requirement. Training conducted throughout the year.
LDAR	116d	Effective September 30, 2005	September 30, 2005 and Annually thereafter	CITGO shall assure that contract employees that perform LDAR work comply with annual LDAR training requirements of Paragraph 116. a.-c.	a.	Complied with requirement.
LDAR	116d for 116a	Effective May 31, 2005	May 31, 2005 and Ongoing	For contract employees performing LDAR work, shall assure that contractor complies with Subparagraph 116.a by requiring contractor to provide training for personnel newly assigned to LDAR responsibilities. Training to be completed prior to beginning such work. Contractor shall provide its training information and records to CITGO.	a.	Complied with requirement. Training conducted throughout the year.
LDAR	116d for 116b	September 30, 2005	September 30, 2005 and Ongoing	For contract employees performing LDAR work, shall assure that contractor complies with the training requirements in Subparagraphs 116.b by completing required initial annual training for all personnel assigned LDAR responsibilities. Contractor shall provide its training information and records to CITGO.	a.	Complied with requirement.
LDAR	116d for 116b	Effective September 30, 2005	September 30, 2005 and Annually thereafter	For contract employees performing LDAR work, shall assure that contractor complies with the training requirements in Subparagraphs 116.b by requiring contractor to provide annual training for all personnel assigned LDAR responsibilities. Contractor shall provide its training information and records to CITGO.	a.	Complied with requirement. System in place to meet ongoing requirement.
LDAR	116d for 116c	September 30, 2005	September 30, 2005 and Ongoing	For contract employees performing LDAR work, shall assure that contractor complies with the training requirements in Subparagraphs 116.c by completing required initial annual training for all other contract operations and maintenance personnel that includes instruction on aspects of LDAR that are relevant to the person's duties. Contractor shall provide its training information and records to CITGO.	a.	Complied with requirement.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
LDAR	116d for 116c	Effective September 30, 2005	September 30, 2005 and Annually thereafter	For contract employees performing LDAR work, shall assure that contractor complies with the training requirements in Subparagraphs 116.c by requiring contractor to provide annual 'refresher" training for all other contract operations and maintenance personnel that includes instruction on aspects of LDAR that are relevant to the person's duties. Contractor shall provide its training information and records to CITGO.	a.	Complied with requirement. System in place to meet ongoing requirement.
LDAR	117	September 30, 2005	September, 2005 and every two years thereafter	Conduct an audit to ensure compliance with all applicable LDAR requirements.	a.	A 3rd party LDAR audit was completed during this reporting period. **See Attachment 9, Appendix F**.
LDAR	118	Initially in semi-annual report post September 30, 2005 and semi-annually thereafter	February 28, 2007 and semi-annually thereafter	Submit a summary, including findings, of the audit report and a list of corrective actions taken during the reporting period.	a. & e.	Complied with requirement. **See Attachment 9, Appendix F** for requested information.
LDAR	118	Ongoing after November 29, 2005	Ongoing	If the results of any of the audits conducted pursuant to Paragraph 117 identify any areas of noncompliance, CITGO shall implement, as soon as practicable, all steps necessary to correct or otherwise address such area(s) of non-compliance and to prevent a recurrence of the cause of that non-compliance, to the extent practicable.	a. & e.	Complied with requirement. **See Attachment 9, Appendix F** for requested information.
LDAR	118	Ongoing after November 29, 2005	Ongoing	For the life of the Consent Decree, CITGO shall retain the audit reports generated pursuant to Paragraph 117 and shall maintain a written record of all corrective actions that CITGO takes in response to deficiencies identified in any audits.	a.	Complied with requirement.
LDAR	119a	February 28, 2006	February 28, 2006 and Ongoing	Utilize an internal leak threshold of 500 ppm VOCs for valves. Excludes pressure relief valves.	a.	Complied with requirement.
LDAR	119b	February 28, 2006	February 28, 2006 and Ongoing	Utilize an internal leak threshold of 2000 ppm VOCs for pumps.	a.	Complied with requirement.
LDAR	120a	February 28, 2006	February 28, 2006 and Ongoing	For regulatory purposes, CITGO may continue to report leak rates in valves and pumps against the applicable regulatory leak definition, or may use the lower, internal leak definitions specified in Paragraph 119.	a.	For regulatory purposes, leak rates against the applicable regulatory leak definition are reported.
LDAR	120b	February 28, 2006	February 28, 2006 and Ongoing	Begin recording, tracking, repairing and re-monitoring all leaks in excess of the internal leak definitions of Paragraph 119 at such time as those definitions become applicable. Make a first attempt to repair and re-monitor leaks within five (5) days of identifiction. Within thirty (30) days of identification, shall either complete repairs and re-monitoring of leaks or place such component on the delay of repair list pursuant to Paragraph 128.	a. & d.	Complied with requirement except as reported in 130b.ix in **Attachment 8**.
LDAR	121a	February 28, 2006	February 28, 2006 and Ongoing	Monitor pumps at the internal leak threshold monthly.	a.	Complied with requirement.
LDAR	121b	February 28, 2006	February 28, 2006 and Ongoing	Monitor valves at the internal leak threshold quarterly.	a.	Complied with requirement.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
LDAR	122	September 30, 2005	September 30, 2005 and Ongoing	Make an "initial attempt" to repair valves with a reading greater than 200ppm of VOCs. The "initial attempt" at repair and remonitoring must be conducted within 5 days of identification.	a.& d.	Complied with requirement except as reported per 130b.viii. In **Attachment 8**.
LDAR	123a	Effective January 26, 2005	January 26, 2005 and Ongoing	Continue to maintain an electronic database for storing and reporting LDAR data.	a.	Complied with requirement.
LDAR	123b	Effective December 31, 2004	December 31, 2004 and Ongoing	Use data loggers and/or other electronic data collection devices during all LDAR monitoring and use best efforts to transfer data daily. Some use of paper logs is allowed provided manually recorded monitoring data is transferred to the electronic data base within 7 days of the monitoring event.	a.	Complied with requirement.
LDAR	124 Subparag. a.	Effective January 26, 2005	January 26, 2005 and Ongoing	Shall have developed and begun implementing procedures for quality assurance/quality control ("QA/QC") reviews of all data generated by LDAR monitoring technicians such that monitoring data is reviewed for QA/QC by the monitoring technicians daily after collection.	a.	Complied with requirement.
LDAR	124 Subparag. b.	Effective January 26, 2005	Quarterly January 26, 2005 and Ongoing	Shall have developed and begun implementing procedures for quality assurance/quality control ("QA/QC") reviews of all data generated by LDAR monitoring technicians such that all monitoring data is subject to a QA/QC review at least once per quarter, including but not limited to the number of components monitored per technician, time between monitoring events, and abnormal data patterns.	a.	Complied with requirement.
LDAR	127a	Effective January 26, 2005	January 26, 2005 and Ongoing	Conduct calibrations of LDAR monitoring equipment as outlined in Test Method 21.	a.	Complied with requirement.
LDAR	127b	Effective January 26, 2005	January 26, 2005 and Ongoing	Conduct calibration drift assessment at the end of each monitoring shift.	a.	Complied with requirement
LDAR	127c	Effective January 26, 2005	January 26, 2005 and Ongoing	Maintain records of instrument calibrations for a period of one year following the date of calibration.	a.	Complied with requirement.
LDAR	128a	February 28, 2006	February 28, 2006 and Ongoing	Delay of repair list requires unit supervision sign-off within 30 days of identifying that a piece of equipment is leaking greater than the applicable leak definition and such equipment is technically infeasible to repair without process unit shutdown.	a.	Complied with requirement.
LDAR	128b	February 28, 2006	February 28, 2006 and Ongoing	Include equipment, placed on "delay of repair," on regular LDAR monitoring as required by Paragrpah 121.	a.	Complied with requirement.
LDAR	128c	February 28, 2006	February 28, 2006 and Ongoing	Use "drill and tap" method, other than on a control or pressure relief valve, if it is leaking at a rate of 10,000 ppm or greater, unless it can be demonstrated that there is a safety, mechanical or major environmental concern posed by repairing the leak in this manner. If necessary, perform two "drill and taps" within 30 days of detecting the leak.	a.	Complied with requirement.
LDAR	128d	February 28, 2006	February 28, 2006 and Ongoing	Use best efforts to isolate and reapair pumps identified as leaking at a rate of 2,000 ppm or greater.	a.	Complied with requirement.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
LDAR	128e	Effective February 28, 2006	February 28, 2006 and Ongoing	Shall take the following actions for any equipment at the Refinery that CITGO intends to place on the "delay of repair" list, under applicable regulations: If a new method develops that is similarly effective as the "drill and tap" method for repairing non-control valves, CITGO will advise EPA and IEPA prior to implementating such new methods.	a.	Complied with requirement. No new methods developed during this reporting period.
LDAR	129	Effective February 28, 2006	February 28, 2006 and Ongoing	Replace, repack, or perform similarly effective repairs on chronically leaking, non-control valves during the next process turnaround after identification.	a.	Complied with requirement.
LDAR	130a.ii.	Semi-Annual Report after February 28, 2006 [August 31, 2006]	February 28, 2006 and Ongoing	Include the following information in the Semi-Annual Progress Report: Notification that the lower leak definitions and increased monitoring frequencies have been implemented according to Paragraphs 119 and 121.	a. & e.	Complied with requirement. The lower leak definitions and increased monitoring frequencies have been implemented according to Paragraphs 119 and 121.
LDAR	130a.viii.	Semi-Annual Report after February 28, 2006 [August 31, 2006]	February 28, 2006 and Ongoing	Shall include the following information in the Semi-Annual Progress Report: Notification that the "delay of repair" procedures under Paragraph 128 have been implemented.	a. & e.	Complied with requirement. The "delay of repair" procedures under Paragraph 128 have been implemented.
LDAR	130b.i. thru 130b.vi.	Each Semi-Annual Report	February 28, 2012	In each Semi-Annual Progress Report, shall also include the following information: a list of the process units monitored during the reporting period; the number of valves and pumps present in each process unit; the number of valves and pumps monitored in each process unit; the number of valves and pumps found leaking; the number of "difficult to monitor" pieces of equipment monitored; the projected month and year of the next monitoring event for that unit.	a. & e.	Complied with requirement. **See Attachment 9 for summary of 130(b)(i) to (vi). See Attachment 9, Appendix A for DTM equipment. See Attachment 9, Appendix B for Monitoring Schedule 130(b)(vi).**
LDAR	130.b.vii.	Each Semi-Annual Report after February 28, 2006 [August 31, 2006]	February 28, 2012	In each Semi-Annual Progress Report, a list of all equipment currently on the "delay of repair" list, the date each component was determined to be leaking at a rate greater than 10,000 ppm, the date of each drill and tap or equivalent method of repair, the associated monitoring results, and whether such activities were completed in a timely manner under Paragraph 128.	a. & e.	Complied with requirement. **See Attachment 9, Appendix C** for requested information.
LDAR	130.b.viii	Each Semi-Annual Report after September 30, 2005 [February 28, 2006]	February 28, 2012	In each Semi-Annual Progress Report, shall also include the following information: the number, date and results of each initial attempt at repair, including a list of all initial attempts/remonitoring that did not occur in a timely manner under Paragraph 122.	a. & e.	Complied with requirement. **See Attachment 9, Appendix D** for requested information.
LDAR	130.b.ix	Each Semi-Annual Report after Feburary 28, 2006 [August 31, 2006]	February 28, 2012	In each Semi-Annual Progress Report, shall also include all instances of failure to comply with the requirements in Paragraph 120b.	a. & e.	Complied with requirement. **See Attachment 9, Appendix E** for requested information.

Consent Decree Topic	Paragraph Reference	Due Date	Submittal/ Completion Date	Requirement Description	¶ 144 Reporting (a. - e.)	Comments
Permitting	132	Varies	As Applicable	Within thirty (30) days after the effective date or establishment of any emission limits and/or standards under Section V of this Consent Decree, shall submit applications to the IEPA to incorporate those emission limitations and/or standards into air permits (other than Title V permits) which are federally enforceable unless such permits with such limits have already been issued or applied for. Shall file any applications necessary to incorporate the requirements of those permits into the Title V permits of the Refinery.	a.	Complied with requirement.
Recordkeeping and Reporting	144b	Each Semi-Annual Report	Semi-Annually	Submit a summary of the emissions data, including a separate indentification of any exceedance(s), as required by Section V, for the six (6) month period covered by the report.	b.	Compled with requirement. **See Attachment 10** for requested information.
Recordkeeping and Reporting	144c	Each Semi-Annual Report	Semi-Annually	Submit a description of any problems anticipated with respect to meeting the requirements of Section V of this Consent Decree.	c.	No problems anticipated with meeting requirements.
Recordkeeping and Reporting	144d	Each Semi-Annual Report	Semi-Annually	Discuss any such matters as CITGO believes should be brought to the attention of IEPA and EPA.	d.	Complied with requirement.

Lemont Refinery
CITGO Petroleum Corporation
Semi-Annual Report
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Attachment 1

FCCU CO, NOx and SO_2 CEM Exceedences

Lemont Refinery
CITGO Petroleum Corporation
Semi-Annual Report
July 1, 2011 – December 31, 2011

ATTACHMENT 1

FCCU CO, NO_X and SO_2 CEM Exceedances

Background

The Lemont Refinery's FCCU began operating its Wet Gas Scrubber on October 21, 2007 and its Selective Catalytic Reduction (SCR) unit on December 7, 2007. The Lemont Refinery monitors its FCCU using Continuous Emission Monitoring System (CEMS) CO, NO_X, SO_2, and O_2 analyzers. New CEMs were installed as a part of the overall project; the new analyzers underwent a relative accuracy test audit (RATA) on April 17, 2008. A RATA was performed on all of the FCCU CEMS systems during the reporting period.

Non-maintenance related deviations of relevant standards are summarized below. These include evaluations against:

CO (12A-6961): hourly and daily rolling 365-day average standards (500 and 100 ppmv, respectively),
NO_X (12A-6964): daily rolling 7-day and 365-day average standards (40 and 20 ppmv, respectively), and
SO_2 (12A-6963): daily rolling 7-day and 365-day average standards (50 and 25 ppmv, respectively).

All are corrected to 0% O_2.

Duration of CO Exceedances

a) The NSPS standard of 500ppmvd CO, corrected to 0% O_2, was exceeded on a 1-hr average as summarized below:

Source	Analyzer	Number of hours exceeding standard on 1-hr average basis		
		3rd Quarter	4th Quarter	Total
FCCU, 112C-1	12A-6961R	0	4	4

b) The 1-hr rolling average CO NSPS standard was exceeded as shown below:

Start	Readings (ppmv), by hour, during periods of excess hourly average
11/22/2011 22:00	551
11/22/2011 23:00	930
11/23/2011 00:00	936
12/10/2011 09:00	816
Total hours excess for Period	4
Total hours excess – 3rd Quarter	0
Total hours excess – 4th Quarter	4
Hours of Operation 3rd Quarter	2,208.00
Hours of Operation 4th Quarter	2,209.00
Hours of Operation, Reporting Period	4,417.00
% Excess 3rd Quarter	0.00%

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Start	Readings (ppmv), by hour, during periods of excess hourly average
% Excess 4th Quarter	0.18%
% Excess for Reporting Period	0.09%

c) The CO 365-day rolling average was exceeded:

Source	Analyzer	Number of days exceeding standard on rolling 365-day average basis		
		3rd Quarter	4th Quarter	Total
FCCU, 112C-1	12A-6961X	0	0	0

d) The CO 365-day rolling average was exceeded as shown below:

Start	Readings (ppmv), by day, during periods of excess daily rolling 365-day average
No exceedances	-
Total days excess for Period	0
Total days excess – 3rd Quarter	0
Total days excess – 4th Quarter	0
Days of Operation 3rd Quarter	92
Days of Operation 4th Quarter	92
Days of Operation, Reporting Period	184
% Excess 3rd Quarter	0%
% Excess 4th Quarter	0%
% Excess for Reporting Period	0%

e) During the second half of 2011 112C-1 did not exceed the NSPS CO standard (500 ppmvd, corrected to 0% excess air, 1-hr average basis) by more that 5 % of the FCCU total operating time in either quarter. The 1-hr average CO exceedances were associated with burner adjustments in the FCCU CO boiler (3 hours), and a FCCU CO Boiler trip due to instrument freeze-up (1 hour).

f) The FCCU CO CEMS downtime is summarized below:

Source	Analyzer	Number of hours of Downtime		
		3rd Quarter	4th Quarter	Total
112C-1	12A-6961R	128.50	68.25	196.75

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Duration of NOx Exceedances

a) The NSPS standard of 40 ppmvd NOx, corrected to 0% O_2, was exceeded on a daily rolling 7-day average as summarized below:

Source	Analyzer	Number of days exceeding standard on rolling 7-day average basis		
		3rd Quarter	4th Quarter	Total
FCCU, 112C-1	12A-6964V	0	0	0

b) The daily rolling 7-day average NO_X standard was exceeded as shown below:

Day	Readings (ppmv), by day, during periods of excess daily rolling 7-day average
No exceedances	-
Total days excess for Period	0
Total days excess – 3rd Quarter	0
Total days excess – 4th Quarter	0
Days of Operation 3rd Quarter	92
Days of Operation 4th Quarter	92
Days of Operation, Reporting Period	184
% Excess 3rd Quarter	0.00%
% Excess 4th Quarter	0.00%
% Excess for Reporting Period	0.00%

c) The daily rolling 365-day average NO_X standard was exceeded:

Source	Analyzer	Number of days exceeding standard on rolling 365-day average basis		
		3rd Quarter	4th Quarter	Total
FCCU, 112C-1	12A-6964X	0	0	0

The rolling 365-day average NO_X limit of 20 ppmv, db (corrected to 0% O_2) became effective on 12/31/2007. 365 days of operation vs. that limit was achieved on 12/30/2008. So that is when that limit became relevant.

d) The NO_X 365-day rolling average was exceeded as shown below:

Start	Readings (ppmv), by day, during periods of excess daily rolling 365-day average
No exceedances	-
Total days excess for Period	0
Total days excess – 3rd Quarter	0
Total days excess – 4th Quarter	0
Days of Operation 3rd Quarter	92
Days of Operation 4th Quarter	92
Days of Operation, Reporting Period	184
% Excess 3rd Quarter	0%
% Excess 4th Quarter	0%
% Excess for Reporting Period	0%

The rolling 365-day average NO_X limit of 20 ppmv, db (corrected to 0% O_2) became effective on 12/31/2007. 365 days of operation vs. that limit was achieved on 12/30/2008. So that is when that limit became relevant.

e) During the 2nd half of 2011 112C-1 did not exceed the NSPS NO_X standard (40 ppmvd, corrected to 0% excess air, daily rolling 7-day average basis) by more than 5 % of the FCCU total operating time in either quarter.

f) The FCCU NO_X CEMS downtime is summarized below:

Source	Analyzer	Number of hours of Downtime		
		3rd Quarter	4th Quarter	Total
112C-1	12A-6964V	128.50	68.25	196.75

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Duration of SO_2 Exceedances

a) The NSPS standard of 40 ppmvd SO_2, corrected to 0% O_2 was exceeded on a daily rolling 7-day average as summarized below:

Source	Analyzer	Number of days exceeding standard on rolling 7-day average basis		
		3rd Quarter	4th Quarter	Total
FCCU, 112C-1	12A-6963V	0	0	0

b) The daily rolling 7-day average SO_2 standard was exceeded as shown below:

Start	Readings (ppmv), by day, during periods of excess daily rolling 7-day average
No exceedances	-
Total days excess for Period	
Total days excess – 3rd Quarter	0
Total days excess – 4th Quarter	0
Days of Operation 3rd Quarter	92
Days of Operation 4th Quarter	92
Days of Operation, Reporting Period	184
% Excess 3rd Quarter	0%
% Excess 4th Quarter	0%
% Excess for Reporting Period	0%

c) The daily rolling 365-day average SO_2 standard (25 ppmv, db, corr to 0% O_2) was exceeded as indicated below:

Source	Analyzer	Number of days exceeding standard on 365-day rolling average basis		
		3rd Quarter	4th Quarter	Total
FCCU, 112C-1	12A-6963X	0	0	0

The rolling 365-day average SO_2 limit of 25 ppmv, db (corrected to 0% O_2) became effective on 12/31/2007. 365 days of operation vs. that limit was achieved on 12/30/2008. So that is when that limit became relevant.

d) The daily rolling 365-day average SO_2 standard (25 ppmv, db corr to 0% O_2) was exceeded as shown below:

Start	Readings (ppmv), by day, during periods of excess daily rolling 365-day average
No exceedances	-
Total days excess for Period	
Total days excess – 3rd Quarter	0
Total days excess – 4th Quarter	0
Days of Operation 3rd Quarter	92
Days of Operation 4th Quarter	92
Days of Operation, Reporting Period	184
% Excess 3rd Quarter	0%
% Excess 4th Quarter	0%
% Excess for Reporting Period	0%

The rolling 365-day average SO_2 limit of 20 ppmv, db (corrected to 0% O_2) became effective on 12/31/2007. 365 days of operation vs. that limit was achieved on 12/30/2008, so that is when that limit became relevant.

e) During the second half of 2010 112C-1 did not exceed the NSPS SO_2 standard (50 ppmvd, corrected to 0% excess air, 1-hr average basis) by more than 5 % of the FCCU total operating time in either quarter.

f) The FCCU SO_2 CEMS downtime is summarized below:

Source	Analyzer	Number of hours of Downtime		
		3rd Quarter	4th Quarter	Total
112C-1	12A-6963V	128.50	68.25	196.75

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Attachment 2

Heaters and Boilers

CITGO Petroleum Corporation

Heaters and Boilers

NOx Control Plan

Final Report

January 31, 2012

CITGO Petroleum Corporation
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Heaters and Boilers
NOx Control Plan
Status Report

The purpose of the Status Report is to advise the EPA and the Co-Plaintiffs of the status of the implementation of CITGO Petroleum Corporation's (CITGO) NOx Control Plan pursuant to Paragraph 56 of the Consent Decree. The NOx Control Plan Status Report is updated annually and submitted as part of the semi-annual report submitted by February 28 of each year pursuant to Section IX of the Consent Decree. Status Reports will be submitted until termination of the Consent Decree or until the reductions required by Paragraph 54 are achieved, whichever occurs first.

The NOx Control Plan and its updates (i.e., Status Reports) shall describe the achieved and anticipated progress of the NOx emissions reductions program for heaters and boilers and shall contain the following information for each heater and boiler greater than 40 MMBtu/hr that CITGO plans to use to satisfy the requirements of Paragraphs 54, 57, and 58.

a. All of the information in Appendix C of the Consent decree (as revised);

b. Identification of the type of Qualifying Controls installed or planned with date installed or planned (including identification of the heaters and boilers to be permanently shut down);

c. To the extent limits exist, the allowable NOx emission rates (in lbs/MMBtu (HHV)), with averaging period) and allowable heat input rate (in MMBtu/hr (HHV)) obtained or planned with dates obtained or planned;

d. The results of emissions tests and annual average CEMS data (in ppmvd at 0% O_2, and lbs/MMBtu) conducted pursuant to Paragraph 59 and tons per year; and

e. The amount in tons per year applied or to be applied toward satisfying Paragraph 54.

As of June 30, 2011, CITGO achieved all necessary emission reductions as specified in Paragraphs 54 and 58. **This report serves as the final NOx Control Plan Status Report.**

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Year 2005 Submittals and Notifications

In February of 2005, CITGO submitted a revised Appendix C (List of CITGO Heaters and Boilers) pursuant to Paragraph 56A. In March of 2005, CITGO submitted a NOx Control Plan for EPA review and comment pursuant to Paragraph 56 of the Consent Decree.

Pursuant to Paragraph 57A of the Consent Decree, CITGO advised the EPA and the Louisiana Department of Environmental Quality (LDEQ) on December 28, 2005, that CITGO has not yet committed to the installation of a cogeneration system at the Lake Charles Refinery. CITGO will go forward with its planning for heater and boiler NO_x reductions as required by Paragraphs 54 and 57.

Information in Appendix C (revised)

As discussed in more detail below, Appendix C was revised in February 2006 to correct an error that was not caught in earlier publications. The changes do not impact the baseline NOx emissions. A summary of the information contained in the revised Appendix C is shown below. A copy of the revised Appendix C is contained in Appendix 1 of this NOx Control Plan Status Report.

Refinery	Year 1 NOx Emissions (Tons/yr)	Year 2 NOx Emissions (Tons/yr)	Average NOx Emissions (Tons/yr)	Design/Permit Total Heat Input (MMBTU/hr)	30% of Total Heat Input (MMBTU/hr)
Lake Charles	7789	7914	7852	9543	**2863**
Lemont	1352	1329	1340	2741	**822**
Corpus Christi	1472	1498	1485	3915	**1175**
Total	10613	10741	10677		
Required NOx Reduction (50%)			**5339**		
2/3 NOx Reduction by September 30, 2008			**3559**		

The 2006 summary reflects two corrections: For the Lemont Refinery, one boiler's firing rate has been corrected, and another boiler that was installed after the baseline period has been removed from the baseline total heat input. The recently installed boiler was installed after the baseline period when an existing boiler that is in the baseline was shut-down subsequent to the baseline period. Neither of these corrections affects baseline emissions.

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Heaters and Boilers Being Evaluated

For each of the refineries where NOx reductions are to take place, the following information as known to-date is provided:

a. Heater or boilers on which qualifying controls were placed or scheduled for placement or equipment shutdown;
b. Type of qualifying controls installed or planned with date installed or planned;
c. To the extent limits exist, the allowable NOx emission rates (in lbs/MMBtu (HHV)),with averaging period) and allowable heat input rate (in MMBtu/hr (HHV)) obtained or planned with dates obtained or planned;
d. The results of emissions tests and annual average CEMS data (in ppmvd at 0% O_2, and lbs/MMBtu) conducted pursuant to Paragraph 59 and tons per year; and
e. The amount in tons per year applied or to be applied toward satisfying Paragraph 54.

Corpus Christi Refinery

Appendix 2 contains detailed information on NOx reductions for the Corpus Christi Refinery.

Lemont Refinery

Appendix 3 contains detailed information on NOx reductions for the Lemont Refinery.

For the Aux Boiler (430B-1), NOx controls were substantially installed by October 2005, but were not operational due to a malfunctioning economizer that was discovered during the installation (flue gas was too hot, rendering the Flue Gas Recirculation (FGR) portion of the project ineffective). The boiler operated for a period without FGR until the replacement of the economizer was completed in May 2006. Additionally, this boiler's design heat input rate has been corrected. This correction results in a revision to the permitted NOx emission rate.

Due to a cancellation of the Reformer Optimization Project, the burner replacement in the 116B-1 and 116B-2 heaters did not take place as originally planned. Burner upgrades were completed in May of 2011.

Lake Charles Refinery

There have been two cases under review at the Lake Charles Refinery. Case A assumes that the Cogen Project discussed in Paragraph 57A will be installed. Case B assumes that the Cogen Project will not be installed in time to meet the timing requirements of the Consent Decree. Case B reflects the option chosen to meet the NOx reduction requirements.

Case B assumed that the Cogen Project at the Lake Charles Refinery would not be constructed. Total NOx emissions reduction required under the Consent Decree is 5339 tons per year and the interim 2/3rds emissions reduction requirement of 3559 tons per year.

Actions taken at the Lake Charles Refinery to meet the NOx emissions reduction requirements are shown in Appendix 4.

Paulsboro and Savannah Refineries (Currently Owned By NuStar Asphalt Refining LLC)

The Paulsboro Refinery installed Ultra Low NOx burners on one of the 60 MMBTU/hr heaters associated with Crude Unit II (E1203) in January of 2008. Based on the size of the heater (<100MMBTU/hr), the Paulsboro Facility did not install a continuous emission monitor or a predictive emissions monitoring system. Instead, the Paulsboro Refinery conducted stack testing after installation of the Ultra Low NOx burners in accordance with paragraph 59c of the Consent Decree. A Permit to Construct (BOP070001) authorizing the installation of the Ultra Low NOx burners was issued from the New Jersey Department of Environmental Protection on November 8, 2007. Construction activities were initiated in January 2008. A Permit to Operate (BOP070001) authorizing operation of the Ultra Low NOx burners was issued on December 27, 2007. Operation of the burners was initiated on January 24, 2008.

A stack test protocol was submitted to the NJDEP on February 22, 2008. The protocol was approved by the NJDEP on August 25, 2008, with the exception of requirements for sulfur testing and sulfur dioxide calculations. Clarification regarding sulfur testing and sulfur dioxide calculation was provided to the NJDEP on September 4, 2008. Mutually agreed upon stack test dates were arranged on September 5, 2008 for October 1 and 2, 2008. Stack testing was completed on the planned dates. Stack test results were reported to applicable authorities on November 13, 2008.

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At the Savannah Refinery, Ultra Low NOx burners were installed in boiler number B004 in November and December of 2008. An application for a 502(b)(10) permit change authorizing installation of Low NOx burners in source B004 was submitted to the Georgia Environmental Protection Division and approved by letter November 4, 2008. An initial performance test was conducted on December 18, 2008 in accordance with paragraph 59c and indicated performance results meet or exceed the target rate of 0.040 pounds of NOx per mmBTU at each firing rate.

Results of emissions tests and annual average CEMS data

The results of emissions tests and annual average CEMS data are shown for each refinery in Appendix 5.

Summary of NOx Reductions

CITGO met the 50% NOx reduction requirement by June 30, 2011. The following table summarizes how the reductions were achieved. A more detailed analysis may be found in Appendices 2, 3 and 4.

Refinery	Average NOx Emissions (Tons/yr)	Pre-Control NOx Emissions Tons/yr	Allowable NOx Emissions Tons/yr	Actual NOx Emissions Reductions Tons/yr	Total Heat Input MMBTU/hr	Actual Heat Input Controlled MMBTU/hr	Per Cent of Total Heat Input
Lake Charles	7852	4769.1	545.6	4223.5	9543	3056.2	32.0%
Lemont	1340	947	328	619.0	2741	1589.5	58.0%
Corpus Christi	1485	580.4	83.3	497.1	3915	1223.0	31.2%
Total	**10677**	**6296.5**	**956.9**	**5339.6**			
Required NOx Reduction (50%)	**5339**			**5339.6**			

In accordance with paragraph 54, the above data can be substituted in the general equation;

$$\sum_{i=1}^{n} (E_{actual})_i - (E_{allowable})_i \geq XXXX$$

$$[(4769.1)-(545.6) + (947)-(328) + (580.4)-(83.3)] \geq 5339$$

$$5339.6 \geq 5339$$

APPENDIX 1

Revised NOx Baseline

Revised Appendix C

February 28, 2006

APPENDIX 2

Corpus Christi Refinery

Actual NOx Reductions

December 31, 2011

APPENDIX 5

Results of Emissions Tests
and
Annual Average CEMS data

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Results of Emissions Tests and Annual Average CEMS data

Corpus Christi Refinery

The NOx emissions for the Corpus Christi Refinery East Plant No. 4 Plat Rx Heater (A,B,C,and D) as measured by the NOx CEMS are summarized below for the years 2005 through 2011:

Corpus Christi Refinery East Plant No. 4 Plat Rx Heater (A,B,C,D)			
Year	NOx (ppmvd at 0% O_2)	NOx (lbs/MMBTU)	NOx (Tons/yr)
2005 [1]	38	0.039	24.82
2006	39	0.036	28.68
2007	35	0.03	19.31
2008	39	0.038	27.36
2009	34	0.033	20.27
2010	35	0.034	18.27
2011	38	0.036	21.83

[1] NOx CEMS on the No. 4 Plat Rx Heater (A,B,C,D) was certified in May 2005. The average NOx concentration and the average NOx rate were averaged for the period from certification through December 31, 2005. The annual NOx emission for 2005 is an estimate. The most recent RATA occurred in August 9-11, 2011 and results were within specified limits.

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Lemont Refinery

The NOx emissions for the Lemont heaters and boilers as measured by NOx CEMS are summarized below for the years 2005 through 2011:

Crude Atmospheric Heater B-1A (111B-1A)			
Year	NOx (ppmvd at 0% O_2)	NOx (lbs/MMBTU)	NOx (Tons/yr)
2005 [1]	36.70	0.0294	46.40
2006	35.90	0.0351	42.87
2007	40.50	0.0407	52.11
2008	41.69	0.0419	48.97
2009	30.69	0.0375	46.81
2010	32.79	0.0400	39.15
2011	28.65	0.0290	34.72

[1] NOx CEMS on Crude Atmospheric Heaters B-1A was certified in September 2005. The average NOx concentration and the average NOx rate were averaged for the period from certification through December 31, 2005. The annual NOx emission for 2005 is an estimate. The most recent RATA occurred in December 2010. Results were within specified limits.

Crude Atmospheric Heater B-1B (111B-1B)			
Year	NOx (ppmvd at 0% O_2)	NOx (lbs/MMBTU)	NOx (Tons/yr)
2005 [1]	41.24	0.0345	41.15
2006	40.1	0.0299	46.01
2007	42.07	0.0423	55.51
2008	42.44	0.0426	50.55
2009	38.01	0.0381	46.38
2010	38.28	0.0383	37.94
2011	37.97	0.0306	35.93

[1] NOx CEMS on Crude Atmospheric Heaters B-1B was certified in September 2005. The average NOx concentration and the average NOx rate were averaged for the period from certification through December 31, 2005. The annual NOx emission for 2005 is an estimate. The most recent RATA occurred in December 2010. Results were within specified limits.

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431B-20 Package Boiler			
Year	NOx (ppmvd at 0% O_2)	NOx (lbs/MMBTU)	NOx (Tons/yr)
2005 [1]	38.04	0.0385	22.308
2006	32.22	0.0326	21.475
2007	33.44	0.0341	21.64
2008	33.64	0.0363	25.12
2009	45.52	0.0463	36.70
2010	45.02	0.0458	35.62
2011	44.73	0.0455	24.88

[1] NOx CEMS on 431B-20 Package Boiler was certified in May 2002. The average NOx concentration and the average NOx rate were averaged for the period from certification through December 31, 2005. The annual NOx emission for 2005 is an estimate. The most recent RATA occurred in December 2010. Results were within specified limits.

Auxiliary Boiler (430B-1)			
Year	NOx (ppmvd at 0% O_2)	NOx (lbs/MMBTU)	NOx (Tons/yr)
2006 [1]	59.68	0.0606	40.01
2007	72.94	0.0744	73.89
2008	59.70	0.0586	66.20
2009	65.17	0.0753	79.81
2010	55.47	0.0619	61.51
2011	57.94	0.0502	35.01

[1] Partial year. Controls (Low NOx Burner + Flue Gas Recirculation) became operational on May 13, 2006. The NOx CEMS on Auxiliary Boiler 430B-1 was certified May 30-June 2 2006, as part of the boiler's annual certification required under the U.S. EPA's NOx SIP-Call regulations (40 CFR Parts 96 and 75). The average NOx concentration and the average NOx rate were averaged for the period when the flue gas recirculation system became operational through December 31, 2006. Thus, the data are for 5/13/06-12/31/06. The most recent annual RATA occurred in March 2011. Results were within specified limits.

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Lake Charles Refinery

The NOx emissions for the Lake Charles heaters and boilers as measured by NOx CEMS are summarized below for the years 2008 through 2010:

B-1/1A Powerhouse Boiler			
Year	NOx (ppmvd at 0% O_2)	NOx (lbs/MMBTU)	NOx (Tons/yr)
2008 [1]	40.2	0.042	443
2009	47.8	0.050	163
2010	58.0	0.060	200
2011	54.9	0.057	224

[1] NOx CEMS on Powerhouse Boiler B-1/1A was certified in August 2008. The average NOx concentration and the average NOx rate were averaged for the fourth quarter of 2008. The annual NOx emission for 2008 is an estimate. The most recent RATA occurred in June of 2011. Results were within specified limits.

B-1B Powerhouse Boiler			
Year	NOx (ppmvd at 0% O_2)	NOx (lbs/MMBTU)	NOx (Tons/yr)
2008 [1]	39.2	0.041	844
2009	47.3	0.049	71
2010	48.1	0.050	77
2011	51.2	0.053	86

[1] NOx CEMS on Powerhouse Boiler B-1B was certified in September 2008. The average NOx concentration and the average NOx rate were averaged for the fourth quarter of 2008. The annual NOx emission for 2008 is an estimate. The most recent RATA occurred in June of 2011. Results were within specified limits.

B-5A Powerhouse Boiler			
Year	NOx (ppmvd at 0% O_2)	NOx (lbs/MMBTU)	NOx (Tons/yr)
2011 [1]	40.7	0.041	23.89

[1] The B-5A boiler was subject to 40 CFR Part 60 Subpart Db and equipped with a certified CEMS prior to the consent decree obligations. Under Subpart Db, annual RATA testing is required in accordance with Appendix F. The most recent RATA occurred in June 2011. Results were within specified limits.

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CEMS Certification

Initial monitor certification was conducted in accordance with Performance Specification (PS) 2 for the oxides of nitrogen analyzer and PS-3 for the oxygen monitor as outlined in Appendix B, Title 40, Part 60 of the Code of Federal Regulations (40 CFR 60). Certification of the CEMS included a 7-day Calibration Drift (CD) evaluation and a Relative Accuracy (RA) test. The evaluation of the CD and RA data and results were conducted for both the PI and NETDAHS data acquisition systems. Oxygen and oxides of nitrogen emission concentration were measured by Method 3A and 7E, respectively.

The B-1/1A CEMS relative accuracy testing was conducted on August 21, 2008 and the B-1/1A 7-day CD test was conducted August 15 - 21, 2008 for the NOx and O_2 monitors. Performance test results were within specified limits.

The B-1B CEMS relative accuracy testing was conducted on September 17, 2008 and the B-1/1A 7-day CD test was conducted September 12 - 18, 2008 for the NOx and O_2 monitors. Performance test results were within specified limits.

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Attachment 3

Fuel Gas Combustion Devices, NSPS Exceedances

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ATTACHMENT 3

Fuel Gas Combustion Devices, NSPS Exceedances

Background

The Lemont Refinery monitors fuel gas to its fuel gas combustion devices using fuel gas H_2S analyzers on eight fuel gas loops. There were periods during the reporting period when various analyzers read above 0.1 gr H_2S/dscf fuel gas (equivalent to 161.5 ppmv) on a 3-hr rolling average basis (calculated hourly).

Duration of Exceedances

a) The NSPS standard of 0.1 gr H_2S /dscf fuel gas (equivalent to 161.5 ppmv) was exceeded on a rolling 3-hr average as summarized below:

Source	Analyzer	Number of hours exceeding standard on 3-hr rolling average basis		
		3rd Quarter	4th Quarter	Total
South Plant fuel gas [a]	43A-1903	0	5	5
U114/116 fuel gas [b, c]	25A490BES	8	0	8
U115/125 fuel gas [c, d]	25A490AES	13	0	13
Coker 2 fuel gas [e, f]	09A-1904	0	0	0
Coker 2 PSA gas [f, g]	09A-1909	0	0	0
U118/122 fuel gas [h]	22A4920AES	0	0	0
U123 fuel gas [i, j]	23A-7000ES	0	0	0
North Plant boiler fuel gas [j, k]	43A-7010E	0	0	0

[a] 102B-2, 103B-1, 111B-1A, 111B-1B, 111B-2, 112B-1, 112B-2, 113B-1, 113B-2, 113B-3, 119C-1A, 119C-1B, 121B-7C, 121B-7D, 430B-1, 590H-1, 590H-2. (Heaters 590H-1 and 2 commenced operation July 2010).

[b] 114B-1, 114B-2, 114B-3, 116B-1, 116B-2, 116B-3, 116B-4

[c] U114/116 and U115/125 fuel gas loops share an analyzer (the analyzer alternates between fuel gas loops).

[d] 115B-1, 115B-2, 125B-1, 125B-2

[e] 106B-1, 107B-21 (idle), 108B-41, 108B-42, 109B-62

[f] Coker 2 fuel gas and Coker 2 PSA gas loops share an analyzer (the analyzer alternates between fuel gas loops).

[g] 109B-62

[h] 118B-1, 118B-51, 122B-1, 122B-2

[i] 123B-1, 123B-2, 123B-3, 123B-4, 123B-5

[j] U123 and North Plant Boiler fuel gas loops share an analyzer (the analyzer alternates between fuel gas loops).

[k] 431B-20

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b) The 3-hr rolling average NSPS standard was exceeded as shown below:

	Readings (ppmv), by analyzer by hour, during periods of excess rolling 3-hour averages							
	South Plant fuel gas	**U114/ 116 fuel gas**	**U115/ 125 fuel gas**	**Coker 2 fuel gas**	**Coker 2 PSA gas**	**U118/ 122 fuel gas**	**U123 fuel gas**	**North Plant boiler fuel gas**
3rd Quarter								
7/22/2011 12:00			207.0					
7/22/2011 13:00		234.5	344.2					
7/22/2011 14:00		614.8	438.4					
7/22/2011 15:00		599.8	370.2					
7/22/2011 16:00		552.3	333.6					
7/22/2011 17:00			239.3					
7/22/2011 18:00			297.8					
7/22/2011 19:00			189.1					
7/22/2011 22:00			261.4					
7/22/2011 23:00		230.7	506.6					
7/23/2011 0:00		415.5	620.1					
7/23/2011 1:00		504.2	443.3					
7/23/2011 2:00		303.8	189.6					
Total hours in 3rd Quarter	0	8	13	0	0	0	0	0
4th Quarter								
10/19/2011 0:00	184.2							
10/19/2011 1:00	173.7							
11/4/2011 15:00		176.5	176.3					
11/4/2011 16:00		176.6	176.4					
11/5/2011 16:00	190.4							
11/5/2011 17:00	190.6							
11/5/2011 18:00	188.1							
Total hours of in 4th Quarter	5	2	2	0	0	0	0	0
No. of hours for Semi-annual Period	**5**	**10**	**15**	**0**	**0**	**0**	**0**	**0**
Hours of Operation, 3rd Quarter	2,208.00	2,208.00	2,208.00	2,208.00	2,208.00	2,208.00	2,208.00	2,208.00
Hours of Operation, 4th Quarter	2,209.00	2,209.00	2,209.00	2,209.00	2,209.00	2,209.00	2,209.00	2,209.00
Total for Semi-annual Period	4,417.00	4,417.00	4,417.00	4,417.00	4,417.00	4,417.00	4,417.00	4,417.00
% Excess, 3rd Quarter	0.00%	0.36%	0.59%	0.00%	0.00%	0.00%	0.00%	0.00%
% Excess, 4th Quarter	0.23%	0.09%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%
% Excess, Semi-annual Period	0.11%	0.23%	0.34%	0.00%	0.00%	0.00%	0.00%	0.00%

c) During the second half of 2011, no fuel gas loop's H_2S exceeded the NSPS 3-hr rolling average standard as a percentage of the respective fuel gas loop's or boiler's total operating times by more than 5% in either quarter.

d) The H_2S CMS downtime for the various fuel gas loops is summarized below:

Source	Analyzer	Number of hours of CMS downtime		
		3rd Quarter	4th Quarter	Total
South Plant fuel gas	43A-1903	76.25	0.00	76.25
U114/116 fuel gas	25A490BES	2.75	51.25	54.00
U115/125 fuel gas	25A490AES	2.75	51.25	54.00
Coker 2 fuel gas	09A-1904	0.75	3.25	4.00
Coker 2 PSA gas	09A-1909	0.75	3.25	4.00
U118/122 fuel gas	22A4920AES	3.25	0.00	3.25
U123 fuel gas	23A-7000ES	0.00	0.00	0.00
North Plant boiler fuel gas	43A-7010E	0.00	0.00	0.00

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Attachment 4

Sulfur Recovery Plant, NSPS Exceedences

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ATTACHMENT 4

Sulfur Recovery Plant, NSPS Exceedances

Background

The Lemont Refinery monitors its Tail Gas Recovery Systems on four Sulfur Plant Claus Trains, Trains "A," "B," "C" and "D," using CEMS SO_2 analyzers. These SO_2 analyzers have recorded the following, non-maintenance related deviations (un-shaded areas below), where the CEMS SO_2 analyzer, corrected for 0% dry O_2, read above 250 ppm on a 12hr rolling average calculated on a 1 hour basis.

Duration of Exceedances

a) The NSPS standard of 250ppm, corrected for 0% dry O_2, was exceeded on a rolling 12-hr average as summarized below:

Source	Analyzer	Number of hours exceeding standard on 12-hr rolling average basis (total/non-maintenance)		
		3rd Quarter	4th Quarter	Total
U119 A-Train	19A-998D	0	12/0	12/0
U119 B-Train	19A-1998D	0	14/0	14/0
U121 C-Train	21A-999D	0	0	0
U121 D-Train	21A-1999D	0	0	0

b) The 12-hr rolling average NSPS standard was exceeded as shown below (shaded periods reflect planned startup/shutdown/maintenance):

Start	Readings (ppmv), by analyzer by hour, during periods of excess rolling 12-hr average, by analyzer			
	U119 A-Train	U119 B-Train	U121 C-Train	U121 D-Train
3rd Quarter	-	-	-	-
4th Quarter	-	-	-	-
10/2/2011 18:00	-	257	-	-
10/2/2011 19:00	-	291	-	-
10/2/2011 20:00	-	319	-	-
10/2/2011 21:00	-	345	-	-
10/2/2011 22:00	-	392	-	-
10/2/2011 23:00	-	408	-	-
10/3/2011 0:00	-	420	-	-
10/3/2011 1:00	-	431	-	-
10/3/2011 2:00	-	431	-	-
10/3/2011 3:00	-	376	-	-
10/3/2011 4:00	-	346	-	-
10/3/2011 5:00	-	317	-	-
10/3/2011 6:00	-	287	-	-
10/3/2011 7:00	-	256	-	-
10/19/2011 3:00	331	-	-	-

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Start	Readings (ppmv), by analyzer by hour, during periods of excess rolling 12-hr average, by analyzer			
	U119 A-Train	**U119 B-Train**	**U121 C-Train**	**U121 D-Train**
10/19/2011 4:00	334	-	-	-
10/19/2011 5:00	336	-	-	-
10/19/2011 6:00	337	-	-	-
10/19/2011 7:00	338	-	-	-
10/19/2011 8:00	338	-	-	-
10/19/2011 9:00	339	-	-	-
10/19/2011 10:00	339	-	-	-
10/19/2011 11:00	339	-	-	-
10/19/2011 12:00	338	-	-	-
10/19/2011 13:00	339	-	-	-
10/19/2011 14:00	291	-	-	-
Total Hrs for Period	**12**	**14**	**0**	**0**
Total Excess Hrs 3rd Quarter	0	0	0	0
Total Excess Hrs 4th Quarter	12	14	0	0
Total Excess Hrs – this period	12	14	0	0
Hrs of Operation 3rd Quarter	2,208.00	2,208.00	2,208.00	2,208.00
Hrs of Operation 4th Quarter	2,208.00	1,823.02	2,208.00	2,208.00
Hrs of Operation – this period	4,416.00	4,031.02	4,416.00	4,416.00
% Excess 3rd Quarter	0.00%	0.00%	0.00%	0.00%
% Excess 4th Quarter	0.54%	0.77%	0.00%	0.72%
% Excess – this period	0.27%	0.35%	0.00%	0.36%

c) The 12-hour rolling average NSPS standard was exceeded:
- 1 event, totaling 12 hours (A-Train CEMS SO_2 Analyzer 19A-998D)
- 1 event, totaling 14 hours (B-train) CEMS SO_2 Analyzer 19A-1998D)

Of the above events, only the 1st event was not associated with train startups or shutdowns.

d) None of the four trains (119A-train, 119B-train, 121C-train, and 121D-train) exceeded the standard by more than 5% of their respective individual total operating time during the period.

Duration of CEMS Downtime

e) The downtime for 119 A-Train and B-Train and 121 C-Train and D-Train SRU SO2 analyzer systems is summarized below:

Source	Analyzer	Number of hours of Downtime		
		3rd Quarter	**4th Quarter**	**Total**
U119 A-Train	19A-999D	1.25	9.25	10.50
U119 B-Train	19A-1999D	0.75	2.00	2.75
U121 C-Train	21A-999D	59.00	34.00	93.00
U121 D-Train	21A-1999D	1.25	18.00	19.25

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Attachment 5

PMO Plan Revision Log

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CITGO Petroleum Corporation
Semi-Annual Report
January 1, 2005 – December 31, 2011

ATTACHMENT 5

PMO Plan Revision Log

7/21/2005 Revision 1

Section 2 –

Sulfur shedding procedures were further developed to handle more situations.

Original: 119404 Emergency Shutdown of C/D MEA Regenerator
121/216 Reaction to C or D Train Trip

Revised: 119503 - Reaction to A-Train and/or B-Train Shutdown
119506 - Emergency Shutdown of C/D MEA Regenerators
119507 - MEA Regenerator Emergency Shutdown Guidelines
121507 - Reaction to C or D Train Trip
121508 - Reaction to C and D Train Trip

Appendix B –

Procedure	Procedure Title	Modification to PMO Plan
119605	119605 - 119F-401C Sour Water Separator Shutdown Procedure	Revised and Title changed (does not have a "/' in title)
119614	119614 - A Train Heat Soak & Burn-Off Guidelines	Revised and Title changed (does not have a "/' in title)
119615	119615 - MEA Regenerator Shutdown Procedure	Revised and Title changed (does not have a "/' in title)
119616	119616 D-3, D-4, D-5 Sour Water Stripper Shutdown Procedure	Revised and Title changed (does not have a "/' in title)
119621	119621 - 19GB-1A/B Combustion Air Blower Shutdown Procedure	Revised and Title changed (does not have a "/' in title)
119623	119623 - B Train Heat Soak & Burn-Off Guidelines	Revised and Title changed (does not have a "/' in title)
119/631	B-Train AAG / Natural Gas Heat Soak and Shutdown with N2 Purge	Revised and Title changed (does not have a "/' in title)
119631	D-6 SW Stripper Shutdown Procedure	Revised and Title changed (does not have a "/' in title)
119/711	119/711 "B" Train Start-Up Procedure	Deleted - Was combined with 119710
119706	119706 - Start-Up Procedure For MEA Reclaimer E-405	Revised and Title changed (does not have a "/' in title)
119707	119707 - D-3 Sour Water Stripper Start-Up	Revised and Title changed (does not have a "/' in title)
119710	119710 - Restarting A or B Train after Tripping out	Revised and Title changed (does not have a "/' in title)
119713	119713 - 19D-1B MEA Regenerator Start-Up Procedure	Revised and Title changed (does not have a "/' in title)
119716	119716 - Sulfur Recovery Train Pre Start-Up Checklist	Revised and Title changed (does not have a "/' in title)
119725	119725 - F401C Startup Procedure	Revised and Title changed (does not have a "/' in title)
119726	119726 - "B" Train Startup Procedure (Following a Complete Burnoff)	Revised and Title changed (does not have a "/' in title)
121/600	121/600 Clearing Procedure For TK478	Was not included in previous PMO Plan
121/602	121/602 31TK-479 Sulfide Spend Caustic Tank Neutralization Procedure	Was not included in previous PMO Plan
121/603	121/603 31TK-483- Fresh Caustic Tank Neutralization Procedure	Was not included in previous PMO Plan
121/605	121/605 Shutting Down Autoclave 21D-5C	Was not included in previous PMO Plan
121/606	121/606 Shutdown And Clearing Of Converter Beds	Was not included in previous PMO Plan
121621	121621 - C Train BMS Initiated Shutdown	Was not included in previous PMO Plan
121622	121622 D Train BMS Initiated Shutdown	Was not included in previous PMO Plan

121631	121631 - C Train Normal Shutdown Procedure	Was not included in previous PMO Plan
121632	121632 - D Train Normal Shutdown Procedure	Was not included in previous PMO Plan
121703	121703 - Presulfiding Procedure For "C" Train	Revised and Title changed (does not have a "/' in title)
121704	121704 - Presulfiding Procedure For "D" Train	Revised and Title changed (does not have a "/' in title)
121705	121705 - C or D Train Pre Start-Up Checklist	Revised and Title changed (does not have a "/' in title)
121723	121723 - C Train Hot-Start Procedure	Revised and Title changed (does not have a "/' in title)
121724	121724 - D Train Hot Start Procedure	Revised and Title changed (does not have a "/' in title)
121730	121730 "C" Train Startup (Without Adequate Burnoff)	Revised and Title changed (does not have a "/' in title)
121732	121732 - "D" Train Startup Procedure (Without Adequate Burnoff)	Revised and Title changed (does not have a "/' in title)

Appendix C –

Procedure	Procedure Title	Modification to PMO Plan
119402	119402 - Emergency Shutdown With No Evacuation	Deleted, actions are now covered in 119505
119500	119500 - H2S Alarm Procedure	Was not inluded in previous PMO Plan
119501	119501 - Low Oxidizer Temperature and/or Oxidizer Flameout	Was not inluded in previous PMO Plan
119502	119502 - Bomb Threat Procedure	Was not inluded in previous PMO Plan
119503	119503 - Reaction to A-Train and/or B-Train Shutdown	New Procedure
119505	119505 - Emergency Shutdown Caused By Complete Power Outage	Was 119403
119506	119506 - Emergency Shutdown of C/D MEA Regenerators	Was 119404
119507	119507 - MEA Regenerator Emergency Shutdown Guidelines	Was 119405
121501	121501 - Provide Continuous Combustion Of H2S During Loss Of Stretford Circulation	Was not inluded in previous PMO Plan
121502	121502 Relighting The Combuster With The Train On Stream And Stretford Circulating	Was not inluded in previous PMO Plan
121503	121503 Relighting The Combuster With The Train On Stream And Stretford Circulating With The Portable Ignitor Device	Was not inluded in previous PMO Plan
121504	121504 Provide Continuous Combustion Of H2S During Planned Shutdown Of Stretford Circulation	Was not inluded in previous PMO Plan
121505	121505 Low Combustor Temperature And/Or Combustor Flameout	Was not inluded in previous PMO Plan
121506	121506 Bomb Threat Procedure	Was not inluded in previous PMO Plan
121507	121507 - Reaction to C or D Train Trip	New Procedure
121508	121508 - Reaction to C and D Train Trip	New Procedure
121509	121509 - Emergency Shutdown With No Evacuation	Was 121402
121510	121510 Oxygen Shutdown at C Train	Was 121421
121511	121511 - Oxygen Shutdown at D Train	Was 121422

12/21/2005 Revision 2

Section 12 –

Section 12 "PMO Plan Responsibilities" was changed to Section 13.
Section 12 "Optimization Studies / Incident Report Root Cause Analyses" was added, which is shown below:

12.0 Optimization Studies / Incident Report Root Cause Analyses

Below are the latest optimizations studies completed since 2004 on each system related to the Sulfur Recovery Complexes:

A and B Train Optimization Study (2004)

- This study conduced by Brimstone Engineering to provide recommendations for the Interim Performance Standard. Nine recommendations were made. All recommendations have either been implemented or are to be implemented at next Turnaround. The list of actions and recommendations are available upon request.

Below are the official incident report completed since 2004 on each system related to the Sulfur Recovery Complexes:

No official incident report root cause analyses have been performed or were required.

Section 6 – Upgrades and Installations Already in Place

C and D Trains:

3) Sulfur Reliability:

A Sulfur Reliability Team was formed, primarily to improve reliability associated with the C and D Trains BMS Shutdown and Startup. The following actions have so far been implemented:

- Replace all BMS limit switch valves with more reliable style (2005)
- Install more reliable style chopper valves on C-Train Nitrogen purge (2005)
- Replace C-Train Waste Heat Boiler Level Switch with a level transmitter used for shutdown (2005)
- Replace C and D-Train Waste Heat Boiler level transmitter with more reliable design (2005)
- Revise BMS startup graphic with more user friendly format (2005)

Appendix B –

Procedure	Procedure Title	Modification to PMO Plan
119700	119700 119E-21 - BFW Cooler Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119701	119701 119F-14 Condensate Drum Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119702	119702 119F-15 Slop Oil Collector Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119703	119703 119F-21C MEA Separator Start-Up and Operating Procedure	Revised and Title Changed (does not have a "/" in title)
119704	119704 119F-50 Condensate Drum Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119705	119705 F-18 Fuel Gas Knockout Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119708	119708 - D-4 Sour Water Stripper Start-Up	Revised to be D-4 Specific
119709	119709 - D-5 Sour Water Stripper Start-Up	Revised and Title Changed (does not have a "/" in title)
119711	119711 - "A" Train Startup After Burn Off	Was 119/724.
119712	119712 - D-6 Sour Water Stripper Start-up	Was 119/724.
119714	119714 19D-401C MEA Rengenerator Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119715	119715 19D-401D MEA Regenerator Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119717	119717 "A" Sulfur Recovery Train Pre Start-Up Pressure Test	Revised and Title Changed (does not have a "/" in title)
119718	119718 "B" Sulfur Recovery Train Pre Start-Up Pressure Test	Revised and Title Changed (does not have a "/" in title)
119719	119719 Lighting Sulfur Train Burners Using The Ignitor Guns	Revised and Title Changed (does not have a "/" in title)
119720	119720 19F-3A MEA Filter Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119721	119721 19F-3B MEA Precoat Filter Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119722	119722 19GB-1A/B Combustion Air Blower Cold Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119723	119723 19G-403E/404C Lean MEA Pump Cold Start-Up Procedure	Revised and Title Changed (does not have a "/" in title)
119/631	B-Train AAG / Natural Gas Heat Soak and Shutdown with N2 Purge	Deleted - This is an obsolete procedure. Use 119623
119/724	119/724 D-6 Sour Water Stripper Start-up	Renumbered as 119712
119/724	119/724 "A" TRAIN STARTUP AFTER BURNOFF	Renumbered as 119711
119/724	119/724 - D-6 Sour Water Stripper STart-up Procedure	Deleted - Actions are now covered in 119712
121721	121721 - C Train-BSRP Cold Start Procedure	Revised and Title Changed (does not have a "/" in title)
121722	121722 - D Train-BSRP Cold Start Procedure	Revised and Title Changed (does not have a "/" in title)
121/731	121/731 "C" Train Normal Cold Startup Procedure	Deleted - Actions are now covered in 121631

8/4/2006 Revision 3

Section 1 – Lemont Refinery Sulfur Recovery Complex Overview

Original –

Two (401 and 402) are designed to process 450 GPM of amine solution and the other two (403 and 404) are designed to process 900 GPM of amine solution."

Revision –

Two (19D-1A and 19D-1B) are designed to process 450 GPM of amine solution and the other two (19D-401C and 19D-401D) are designed to process 900 GPM of amine solution."

Original –

6. Needle Coker Fuel Gas

Revision –

6. North Plant Coker Fuel Gas

Section 6 – Upgrades and Installations Already in Place

C and D Trains – 3) Sulfur Reliability:

Original --

- Install more reliable style chopper valves on C-Train Nitrogen purge (2005)
- Replace C-Train Waste Heat Boiler Level Switch with a level transmitter used for shutdown (2005)

Revision --

- Install more reliable style chopper valves on C-Train and D-Train's nitrogen purge, natural gas and oxygen chopper valves (2005/2006)
- Replace C-Train and D-Train Waste Heat Boiler Level Switch with a level transmitter used for shutdown (2005/2006)

A and B Trains –

Original --

1) Remote Igniters on A-Train Front End Burner

Revision --

1) Remote Igniters on A-Train Front End and Aux Burner

Added –

3) Sulfur Pit Vent Gas Recovery
This project routes the trace amounts of H2S from A-Train sulfur pit to the incinerator for conversion to SO2.

Appendix B –

Procedure #	Procedure Title	Modification to PMO Plan
119601	119601 - D-6 Shutdown for Instrument Transfer to Delta V	New Procedure
119711	119711 - A-Train Startup After Burn Off or Catalyst Change Out	Revised and Title Changed
119727	119727 - 19D-1A Regenerator Start-Up Procedure	New Procedure - Similar to 119113
121706	121706 - C or D Sulfur Recovery Train Pre Startup Pressure Test	New Procedure- Similar to 119117 and 119118
121709	121709 Lighting The Tail Gas Combustor	Revised and Title Changed (does not have a "/" in title)
121/700	121/700 Commissioning & Start-Up Unit 121 Sulfur And BSRP Complex Refractory Curing Procedure	Deleted - Actions are now covered in 121721 and 121722
121/606	121/606 Shutdown And Clearing Of Converter Beds	Expired - Actions are now covered in 121631 and 121632
121/701	121/701 "C" Train/BSRP Refractory Dry-Out Procedure	Expired - Actions are now covered in 121814
121/702	121/702 "D" Train/BSRP Refractory Dry-Out Procedure	Expired - Actions are now covered in 121814
121-722	121/722 "D" Train/BSRP Cold Start Procedure	Expired - Actions are now covered in 121722

1/24/2007 Revision 4

Section 6 – Mechanical Upgrades and Installations

C and D Trains - Sulfur Reliability:

Original --

A Sulfur Reliability Team was formed primarily to improve reliability associated with the C and D Trains BMS Shutdown and Startup Systems.

- Replace BMS limit switch valves with more reliable style,
- Install more reliable style chopper valves on C-Train and D-Train's nitrogen purge, natural gas and oxygen chopper valves (2005/2006)
- Replace C-Train and D-Train Waste Heat Boiler Level Switch with a level transmitter used for shutdown (2005/2006)
- Replaced C and D-Train Waste Heat Boiler level transmitter with more reliable design.
- Revised BMS startup graphic with more user friendly format.

Revision --

A Sulfur Reliability Team was formed primarily to improve reliability associated with the C and D Trains BMS Shutdown and Startup Systems.

- Replace BMS limit switch valves with more reliable style,
- Install more reliable style chopper valves on C-Train and D-Train's nitrogen purge, natural gas and oxygen chopper valves (2005/2006)
- Replace C-Train and D-Train Waste Heat Boiler Level Switch with a level transmitter used for shutdown (2005/2006)
- Replaced C and D-Train Waste Heat Boiler level transmitter with more reliable design.
- Revised BMS startup graphic with more user friendly format.
- Upgraded all piping and valves on C and D-Train contact condensers to correct metallurgy (from carbon steel to 304 stainless steel).

Added –

4) Sulfur Pit Vent Gas Recovery:
This project routes the trace amounts of H2S from D-Train sulfur pit to the incinerator for conversion to SO2.

Lemont Refinery
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Section 13 – PMO Plan Responsibilities

Original --

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Revision –

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Appendix B –

Procedure #	Procedure Title	Modification to PMO Plan
119601	119601 - Temporary shutdown of D-6 Sour water Stripper	Revised & Title Changed
119614	119614 - A Train Shutdown Procedure	Revised & Title Changed
119623	119623 - B Train Shutdown Procedure	Revised & Title Changed
119501	119501 - A or B Train Oxidizer Flameout or Low Oxidizer Temp	Revised & Title Changed
121504	121504 Relighting The Combustor During Loss of Stretford Circulation	Revised & Title Changed

Planned Upgrades and Installations

Original –

2) Sulfur Pit Vent Gas Recovery
This project will route the trace amounts of H2S that are in the sulfur pit to the incinerator for conversion to SO2.

Revision –

2) Sulfur Pit Vent Gas Recovery
This project will route the trace amounts of H2S that are in each sulfur pit to the incinerator for conversion to SO2. A-Train and D-Train pit vents are currently installed.

Added –

4) MEA Conversion
This project will convert the refinery amine system into a system that instead will use a tertiary amine. The new amine will allow for increased concentration and higher rich solvent loadings, which can greatly reduce the system circulation, save energy, and unload the capacity-limiting lean amine cooling system.

07/25/2007 Revision 5

Section 2 – Sulfur Shedding Procedures

Original --
Operators and supervisors should maintain records of what actions were taken in accordance with this plan. This plan is encompassed in the following procedures depending on the cause of the sulfur shed.
119503 - Reaction to A-Train and/or B-Train Shutdown
119506 - Emergency Shutdown of C/D MEA Regenerators
119507 - MEA Regenerator Emergency Shutdown Guidelines
121507 - Reaction to C or D Train Trip
121508 - Reaction to C and D Train Trip

Revision --
Operators and supervisors should maintain records of what actions were taken in accordance with this plan. This plan is encompassed in the following procedures depending on the cause of the sulfur shed.
119503 - Reaction to A-Train and/or B-Train Shutdown
119506 - Emergency Shutdown of C/D MEA Regenerators
119507 - MEA Regenerator Emergency Shutdown Guidelines
121500 - Refinery Sulfur Train Load Shedding Procedure
121507 - Reaction to C and/or D Train Trip

- Combined 121507 and 121508 – Renamed 121507 Reaction to C and/or D Trian Trip and deleted 121508
- Added 121500 – Refinery Sulfur Train Load Shedding Procedure

Section 6 – Mechanical Upgrades and Installations

Original --

4) MEA Conversion
   This project will convert the refinery amine system into a system that instead will use a tertiary amine. The new amine will allow for increased concentration and higher rich solvent loadings, which can greatly reduce the system circulation, save energy, and unload the capacity-limiting lean amine cooling system.

Revision --

4) MEA Conversion to MDEA
   This project will convert the refinery amine system into a system that instead will use a tertiary amine. The new amine will allow for increased concentration and higher rich solvent loadings, which can greatly reduce the system circulation, save energy, and unload the capacity-limiting lean amine cooling system.Combined

- to MDEA

Section 10 – Notification Procedure

- Added

5) Event: Tail Gas Oxidizer Stack Temperature Falls Below 874°F
   Action: Operator immediately notifies Shift Area Supervisor.
   Operator calls in a 3333.
   Operator documents the event with a Malfunction/Breakdown Report.
   Supervisor notifies Environmental Department.

Section 11 – Process Hazard Analysis Evaluations

- Added – Hazop A&B Train Tail Gas Unit Project

Section 13 – PMO Plan Responsibilities

Original --

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Appendix B –

Procedure #	Procedure Title	Modification to PMO Plan
119/606	119/606 119F-50 Condensate Drum Shutdown Procedure	Procedure Renumbered 119606 and Procedure Renamed 119606…
121500	121500 Refinery Sulfur Train Load Shedding Procedure	Created New Procedure
121507	121507 Reaction to C and/or D Train Trip	Removed Procedure 121508, combined 121508 and 121507, renamed 121507 to Reaction to C and/or D Train Trip
121508	121508 Reaction to C and D Train Trip	Removed Procedure 121508, combined 121508 and 121507, renamed 121507 to Reaction to C and/or D Train Trip

02/06/2008 Revision 6

Section 6 – Mechanical Upgrades and Installations

Original
C and D Trains
4) Sulfur Pit Vent Gas Recovery
…H2S from D-Train
Revision
4) …H2S from C and D-Train

Original
A and b Trains
3) Sulfur Pit Vent Gas Recovery
…H2S from A-Train
Revision
4) …H2S from A and B-Train

Original
Planned Upgrades and Installations
2) Sulfur Pit Vent Gas Recovery
Revision
Removed – Item completed

Original
Planned Upgrades and Installations

2) Sulfur Pit Vent Gas Recovery

Revision

Removed – Item completed, realigned numbering

Original

Planned Upgrades and Installations

Now 1-3

Revision

4) Medium Level Oxygen Enrichment

C and D Train Front End Burners for the combustion furnace will be modified to accommodate medium level oxygen enrichment. Modifications will add additional capacity to both C and D Train.

Section 10 – Notification Procedure

Original

No number 6

Revision

6) Event: A or B Train Oxidizer Stack Temperature fall below 1050 for the daily average on a 24 rolling hour basis.

Action: Operator immediately notifies Shift Area Supervisor
Operator calls in a 3333.
Operator documents the event with a Malfunction/Breakdown Report.
Shift supervisor notifies Environmental Department

Section 12 – Optimization Studies/Incident Report Root Cause Analyses

Original

All recommendations either have been or are to be implemented at next Turnaround.

Revision

All recommendations have been implemented

Original

No 2007-12-06

Revision

An Acid gas flaring event at 844C-2 occurred December 6 (3:11-3:52) when both C- and D-Trains tripped. Andy Kobler was the lead investigator. Copies of the Incident Investigation Report 071206 provided upon request.

Section 13 – PMO Plan Responsibilities

Original

… updated on an annual basis

Revision

… updated on a semi-annual basis

Appendix B – Start-up and Shutdown Procedures

Revisions

Procedures removed

119605 - 119F-401C Sour Water Separator Shutdown Procedure
119700 119E-21 - BFW Cooler Start-Up Procedure
119701 119F-14 Condensate Drum Start-Up Procedure
119702 119F-15 Slop Oil Collector Start-Up Procedure
119705 F-18 Fuel Gas Knockout Start-Up Procedure
121706 - C or D Sulfur Recovery Train Pre Startup Pressure Test
119/600 119E-21 BFW Cooler Shutdown Procedure
119/602 119F-14 Condensate Drum Shutdown Procedure
119/603 119F-15 Slop Oil Collector Shutdown Procedure
119/604 119F-20 Sour Water Collection Drum Shutdown Procedure
119/606 119F-50 Condensate Drum Shutdown Procedure
119/609 F-7 And 4 Tank Shutdown Procedure
119/610 F-18 Fuel Gas Knockout Shutdown Procedure
119/612 Procedure For Clearing Overhead Condensers
119/617 19F-3A MEA Filter Shutdown Procedure
119/619 Procedure To Slump D-4 Stripper
119/624 SW Gas Header Shutdown/Clear Procedure
119/627 MEA Gas Header Shutdown/Clear Procedure
121/600 Clearing Procedure For TK478
121/603 31TK-483- Fresh Caustic Tank Neutralization Procedure

Procedures Added

119613 Regenerator Shutdown Procedure
121633 C Sulfur Train Hot Shutdown Procedure
121634 C Sulfur Train Hot Shutdown Procedure

Appendix C – Lemont Refinery SRC Emergency Operating Procedures

Revision

Procedures Removed

121505 Low Combustor Temperature And/Or Combustor Flameout
121509 - Emergency Shutdown With No Evacuation

Procedures Added

119504 Response to Sulfur Pit Fire
121512 Response to Sulfur Pit Fire

Lemont Refinery
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07/01/2008 Revision 7

Section 1 – Lemont Refinery Sulfur Recovery Complex Overview

Original --
There are a total of twelve absorbers on the refinery amine header, each listed below:

Revision --
There are a total of thirteen absorbers on the refinery amine header, each listed below:

Added --
13. North Plant Flare

Section 6 – Mechanical Upgrades and Installations

Under C and D Train Sulfur ReliabilityAdded --
- Sealing Sulfur Pits to ensure ejector is working properly and sulfur vapor is being recovered.
- Changed the nitrogen purge on C-Train to improve train reliability.

Under A and B Train Added --
4) Sulfur Reliability
Sealing Sulfur Pits to ensure ejector is working properly and sulfur vapor is being recovered.

Under Planned Upgrades and Installations Added --
5) D-Train nitrogen purge configuration
Nitrogen purge configuration will be changed to improve reliability.

Section 9 – Critical Operating Variables

Added --

Flaring of Sour Water or MEA Acid Gas	• DCS Display • Flow Meter on Sour Water Gas Vent and MEA Acid Gas Vent • Deviation and High pressure alarm on MEA Acid Gas • Deviation alarm on Sour Water Gas	• Troubleshoot Process • Notify Shift/Unit Supervisor • Cut H2S Production per Sulfur Shedding Procedure if necessary
Tail Gas Oxidizer Stack Temperature Falls Below	• DCS Display • Temperature on Tail	• Troubleshoot Process • Route MEA Gas to

874°F	Gas Oxidizer Stack • Low alarm on Tail Gas Oxidizer Stack Temperature • Low low alarm on Tail Gas Oxidizer Stack Temperature	other Trains if possible • Notify Shift/Unit Supervisor

Section 12 – Process Hazard Analysis Evaluations

Added --

An acid gas flaring event at 844C-2 occurred March 8, 2008 (03:30) when D train tripped. Joe Noreiko was the lead investigator. Copies of the Investigation Report 080308 are provided upon request.

Section 13 – PMO Plan Responsibilities

Original --

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Revision –

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Appendix B & C –

Procedure #	Procedure Title	Modification to PMO Plan
119606	**119606 119F-50 Condensate Drum Shutdown Procedure**	Added missing procedure
119617	**119617 19F-3A MEA Filter Shutdown Procedure**	Added missing procedure
119728	**119728 - Nitrogen Purge D-3 Stripper prior to Startup**	Added missing procedure
119729	**119729 - Regenerator Startup**	Added missing procedure
119/724	**119/724 D-6 Sour Water Stripper Start-up**	Added missing procedure
121/606	**121/606 Shutdown And Clearing Of Converter Beds**	Added missing procedure
121/701	**121/701 "C" Train/BSRP Refractory Dry-Out Procedure**	Added missing procedure
121/702	**121/702 "D" Train/BSRP Refractory Dry-Out Procedure**	Added missing procedure
121500	**121500 - REFINERY SULFUR TRAIN LOAD SHEDDING PROCEDURE**	Added missing procedure

Procedure #	Procedure Title	Modification to PMO Plan
121509	**121509 - Emergency Shutdown With No Evacuation**	Added missing procedure
121513	**121513 - BMS PANEL C SULFUR TRAIN HOT START**	Added missing procedure
121514	**121514 - BMS PANEL D SULFUR TRAIN HOT START**	Added missing procedure
121515	**121515 - D Sulfur Train Shutdown with C Sulfur Train in T/A**	Added missing procedure
121/602	121/602 31TK-479 Sulfide Spend Caustic Tank Neutralization Procedure	Deleted Procedure - no longer in data base
121508	121508 - Reaction to C and D Train Trip	Deleted Procedure - no longer in data base
119/725	119725 – F401C Startup Procedure	Edited Title

01/01/2009 Revision 8

Section 5 – Ultrasonic thickness monitoring

Original --
The hard copy results of the thickness readings are filed with the Inspection Department and are retained for the life of the equipment location.

Revision --
The hard copy results of the thickness readings are filed with the Inspection Department and are retained for the life of the equipment.

Section 6 – Mechanical Upgrades and Installations

Upgrades and Installations Already in Place

C and D Trains:
Revision -- Added
5) Metallurgy Upgrades:
Piping in high temperature MEA service (piping between the regenerator / reboiler and the regenerator / bottoms cooler) will be upgraded to stainless steel. This is to reduce corrosion. A portion of this has been completed.

A and B Trains:
Revision -- Added
5) D-Train nitrogen purge configuration:
Nitrogen purge configuration will be changed to improve reliability.

Planned Upgrades and Installations

Original --
Along with the changes and upgrades in place, there are plans in place to perform several more changes and upgrades, which are planned to be implemented between 2005 and 2009.

Revision --

Along with the changes and upgrades in place, there are plans in place to perform several more changes and upgrades, which are planned to be implemented between 2009 and 2011.

Original --

1) Metallurgy upgrades

Piping in high temperature MEA service (piping between the regenerator / reboiler and the regenerator / bottoms cooler) will be upgraded to stainless steel. This is to reduce corrosion. A portion of this has been completed.

Revision --

1) Metallurgy upgrades

Piping in high temperature MEA service (piping between the regenerator / reboiler and the regenerator / bottoms cooler) will be upgraded to stainless steel. This is to reduce corrosion. A portion of this has been completed.

Revision -- Added

5) Autoclave Improvements

This project will cover installing contratrace on the overhead piping of C & D Autoclaves and fixing the level transmitters.

6) Replace Stretford Isolation valves and Balance Tank

This project will cover changing out the isolation valves between the oxidizer tanks and between the balance tank and the oxidizer tanks. This will allow the tanks to be worked on without slowing down the refinery. Also the Balance tank needs to be replaced.

7) pH meter reliability

This project will cover upgrading the current pH meters on the C & D contact condensers.

8) D-Train Combustor Fuel Gas Regulator Hand Wheel

This project will cover installing a hand wheel on the fuel gas regulator for D combustor. This will allow D-Train to continue running while doing maintenance on this regulator.

Section 9 – Critical Operating Variables

Original --

Tail Gas Oxidizer Stack Temperature Falls Below 874°F

Revision --

Tail Gas Oxidizer Stack Temperature Falls Below 875°F

Original --

A or B Train Oxidizer Stack Temperature Falls Below 1050 for the daily average on a 24 hour basis

Revision --

A or B Train Oxidizer Stack Temperature Falls Below 875 °F

Section 10 – Notification Procedure

Original --

5) Event:	Tail Gas Oxidizer Stack Temperature Falls Below 874°F
Action:	Operator immediately notifies Shift Area Supervisor. Operator calls in a 3333. Operator documents the event with a Malfunction/Breakdown Report. Supervisor notifies Environmental Department.

Revision --

5) Event:	Tail Gas Oxidizer Stack Temperature Falls Below 875°F
Action:	Operator immediately notifies Shift Area Supervisor. Operator calls in a 3333. Operator documents the event with a Malfunction/Breakdown Report. Supervisor notifies Environmental Department.

Original --

6) Event:	A or B Train Oxidizer Stack Temperature fall below 1050 for the daily average on a 24 rolling hour basis.
Action:	Operator immediately notifies Shift Area Supervisor. Operator calls in a 3333. Operator documents the event with a Malfunction/Breakdown Report. Supervisor notifies Environmental Department.

Revision --

6) Event:	A or B Train Oxidizer Stack Temperature fall below 875 °F.
Action:	Operator immediately notifies Shift Area Supervisor. Operator calls in a 3333. Operator documents the event with a Malfunction/Breakdown Report. Supervisor notifies Environmental Department.

Section 12 – Optimization Studies / Incident Report Root Cause Analyses

Revision -- Added

An acid gas flaring event at 844C-2 occurred November 21, 2008 (21:52) when an operator error tripped D train. Andy Kobler was the lead investigator. Copies of the Investigation Report 112108 are provided upon request.

Section 13 – PMO Plan Responsibilities

Original --

Beverly Pate

Operations Process Engineer
(630) 257 - 4939
bpate@citgo.com

Revision --

Beverly Rah
Operations Process Engineer
(630) 257 - 4939
bpate@citgo.com

Appendix B Start-up and Shutdown Procedures

Procedure #	Procedure Title	Modification to PMO Plan
119601	119601 - Shutdown of D-6 Sour water Stripper Due to Loss of Pumparound Fans	Updated Title
119719	119719 Using Ignitors for Lighting Sulfur Train Burners	Updated Title
119724-B	**119/724 D-6 Sour Water Stripper Start-up**	Procedure number updated to new system
119725-B	119/725 – F401C Startup Procedure	Procedure number updated to new system

Appendix C Lemont Refinery SRC Emergency Operating Procedures

Procedure #	Procedure Title	Modification to PMO Plan
119506-A	119506 - Emergency Shutdown With No Evacuation	Procedure number updated to new system
119506-B	119506 - Emergency Shutdown of C/D MEA Regenerators	Procedure number updated to new system

07/01/2009 Revision 9

Section 1 – Lemont Refinery Sulfur Recovery Complex Overview

Original --
Two of the trains (A and B) have SRU/Thermal Oxidizer setup

Revision --
Two of the trains (A and B) have SRU/Beavon/Thermal Oxidizer setup

Original --
Each Beavon Tail Gas Unit is equipped with a vanadium/autoclave reclamation system.

Revision --
A and B Train's Beavon Tail Gas Unit is equipped with a Flexsorb amine reclaimation system. C and D Train's Beavon Tail Gas Units are equipped with a vanadium/autoclave reclamation system

Original --

Each ARU train is independent with their own rich amine flash drum, lean and rich amine exchangers.

Revision --

Each ARU is independent with their own rich amine flash drum, lean and rich amine exchangers

Original --

There are a total of thirteen absorbers on the refinery amine header, each listed below:

Revision --

There are a total of thirteen absorbers on the refinery amine header, each listed below. The North Plant Coker Recycle Gas and South Plant Coker Wet Gas Absorbers are not in service.

Original --

5. Hydrotreater Recycle Gas

Revision --

5. North Plant Coker Recycle Gas

Original --

12. Coker Wet Gas

Revision --

12. South Plant Coker Wet Gas

Section 2 – Sulfur Shedding Procedure

Original --

1. Use available SRU/MEA capacity
2. Stop LCO feed at the Diesel Hydrotreater (U25)
3. Reduce FCC feed (U12)
4. Reduce feed to Coker (U13)
5. Reduce Feed to North Plant Coker (U08)
6. Reduce Catalytic Reformer feed (U14)
7. Reduce Feed to Diesel Hydrotreater (U25)
8. Reduce Sour Water Stripper Feed, hold inventory in tankage (U19, U43)
9. Reduce crude oil feed rate (U11)

Revision --

1. Use available SRU/MEA capacity
2. Stop LCO feed at the Diesel Hydrotreater (U25)
3. Reduce feed to Coker (U13)

4. Reduce Feed to North Plant Coker (U08)
5. Stop LCO feed to FCC first, then Reduce LCGO (U12)
6. Reduce feed to ISAL
7. Reduce feed to Crude (U11)
8. Reduce Catalytic Reformer feed (U14)
9. Reduce LCGO feed to Diesel Hydrotreater (U25)

Original --

Operators and supervisors should maintain records of what actions were taken in accordance with this plan. This plan is encompassed in the following procedures depending on the cause of the sulfur shed.

119503 - Reaction to A-Train and/or B-Train Shutdown
119506 - Emergency Shutdown of C/D MEA Regenerators
119507 - MEA Regenerator Emergency Shutdown Guidelines
121500 - Refinery Sulfur Train Load Shedding Procedure
121507 - Reaction to C and/or D Train Trip

Revision --

Operators and supervisors should maintain records of what actions were taken in accordance with this plan. This plan is encompassed in the following procedure and covers a range of events that require sulfur load shedding.

121500 - Refinery Sulfur Train Load Shedding Procedure

Section 6 – Mechanical Upgrades and Installations

Upgrades and Installations Already in Place

Revision -- Added

General Sulfur Unit:

1) Checking Ground Faults (2009)

The procedure for checking for ground faults was updated as well as better labels for the breakers to prevent unplanned equipment shutdowns.

2) Load Shedding Procedure (2009)

The procedure for load shedding was updated to maximize effectiveness by changing the load shedding sequence, have a board operator on an unaffected unit implement load shedding and give all involved board operators annual training.

C and D Trains:

Revision -- Removed

5) Metallurgy Upgrades:

Piping in high temperature MEA service (piping between the regenerator / reboiler and the regenerator / bottoms cooler) will be upgraded to stainless steel. This is to reduce corrosion. A portion of this has been completed.

Revision -- Added

5) Autoclave Level Control (2009)
The level control for the autoclaves was updated to provide more reliable operation.

A and B Trains:

Original --

4) Sulfur Reliability:
This project seals the Sulfur Pits to ensure ejector is working properly and sulfur vapor is being recovered.

Revision --

4) Sealing Sulfur Pits
This project seals the Sulfur Pits to ensure ejector is working properly and sulfur vapor is being recovered.

Revision -- Removed

5) D-Train nitrogen purge configuration:
Nitrogen purge configuration will be changed to improve reliability.

Revision -- Added

5) Tail gas recovery for A and B
This project installed a tail gas system for A and B trains, including a Beavon reactor and amine reclaimation system.

MEA System:

Revision -- Added

2) Metallurgy Upgrades:
Piping in high temperature MEA service (piping between the regenerator / reboiler and the regenerator / bottoms cooler) will be upgraded to stainless steel. This is to reduce corrosion.

<u>Planned Upgrades and Installations</u>

Revision -- Removed

1) Metallurgy upgrades
Piping in high temperature MEA service (piping between the regenerator / reboiler and the regenerator / bottoms cooler) will be upgraded to stainless steel. This is to reduce corrosion. A portion of this has been completed.

Revision -- Removed

2) Tail gas recovery for A and B
Currently A and B Train do not have Tail Gas Recovery, it is sent directly to an incinerator. The project to install a tail gas system for A and B trains is currently in the design stage, and will be installed by December 2008.

Original --

5) Autoclave Improvements
This project will cover installing contratrace on the overhead piping of C & D Autoclaves and fixing the level transmitters.

Revision --

3) Autoclave Improvements
This project will cover installing controtrace on the overhead piping of C & D Autoclaves.

Revision -- Added

6) D-Train Nitrogen Purge Configuration
This project will update purge timers for C&D trains.

Section 9 – Critical Operating Variables

Original --

Condition	Method of Monitoring	Actions
High Reading on Fuel Gas H2S Analyzer	• DCS Display • High alarm on Fuel Gas H2S at 141 ppm • High High alarm on Fuel Gas H2S at 159 ppm	• Troubleshoot Process • Verify Proper MEA regeneration • Verify Correct MEA Fuel Gas Absorber Rates • Verify Max Lean MEA Cooling • Notify Shift/Unit Supervisor for additional moves
High Reading on C or D Train SO2 Analyzers	• DCS Display • High alarm on CEMS SO2 at 250 ppm for a 1 hour average	• Troubleshoot Process • Alert Analyzer Group and have them verify accuracy of meters • Route MEA Gas to other Trains if possible • Notify Shift/Unit Supervisor
Pluming From Tail Gas Incinerator	• Visual Observation • High alarm on CEMS • DCS Stack Temperature Rise • High alarm on Stack Temp at 1250 F	• Troubleshoot Process • Check Sulfur Leg for Potential plugging • Route MEA Gas to other Trains if possible • Notify Shift/Unit

	• High High alarm on Stack Temp at 1350 F	Supervisor
Flaring of Sour Water or MEA Acid Gas	• DCS Display • Flow Meter on Sour Water Gas Vent and MEA Acid Gas Vent • Deviation and High pressure alarm on MEA Acid Gas • Deviation alarm on Sour Water Gas	• Troubleshoot Process • Notify Shift/Unit Supervisor • Cut H2S Production per Sulfur Shedding Procedure if necessary
Tail Gas Oxidizer Stack Temperature Falls Below 875°F	• DCS Display • Temperature on Tail Gas Oxidizer Stack • Low alarm on Tail Gas Oxidizer Stack Temperature • Low low alarm on Tail Gas Oxidizer Stack Temperature	• Troubleshoot Process • Route MEA Gas to other Trains if possible • Notify Shift/Unit Supervisor
A or B Train Oxidizer Stack Temperature Falls Below 875 °F	• DCS Display • Temperature on A and B Oxidizer Stacks • Low alarm on A and B Oxidizer Stack Temperatures • Low low alarm on A and B Oxidizer Stack Temperatures	• Troubleshoot Process • Route MEA Gas to other Trains if possible • Notify Shift/Unit Supervisor

Revision --

Condition	Method of Monitoring	Actions
High Reading on Fuel Gas H2S Analyzer	• DCS Display • High alarm on Fuel Gas H2S at 159 ppm	• Troubleshoot Process • Verify Proper MEA regeneration • Verify Correct MEA Fuel Gas Absorber Rates • Verify Max Lean MEA Cooling • Notify Shift/Unit Supervisor for additional moves
High Reading on Train SO2 Analyzers	• DCS Display • High alarm on CEMS	• Troubleshoot Process • Alert Analyzer Group

	SO2 at 250 ppm for a 1 hour average	and have them verify accuracy of meters • Route MEA Gas to other Trains if possible • Notify Shift/Unit Supervisor
Flaring of Sour Water or MEA Acid Gas	• DCS Display • Flow Meter on Sour Water Gas Vent and MEA Acid Gas Vent • Deviation and High pressure alarm on MEA Acid Gas • Deviation alarm on Sour Water Gas	• Troubleshoot Process • Notify Shift/Unit Supervisor • Cut H2S Production per Sulfur Shedding Procedure if necessary
Tail Gas Oxidizer Stack Temperature Falls Below 875°F	• DCS Display • Temperature on Tail Gas Oxidizer Stack • Low alarm on Tail Gas Oxidizer Stack Temperature	• Troubleshoot Process • Route MEA Gas to other Trains if possible • Notify Shift/Unit Supervisor

Note: Pluming was removed because now that there is a tail gas unit on A&B it is extremely unlikely.

Section 10 – Notification Procedure

Original --

2) Event: C or D Train SO2 analyzers show a reading above 250ppm on a 12 hour rolling average corrected to 0% excess air.

Revision --

2) Event: Train SO2 analyzers show a reading above 250ppm on a 12 hour rolling average corrected to 0% excess air.

Revision -- Removed

3) Event: Pluming from tail gas incinerator is seen for at least 8 min.
Action: Operator immediately notifies Shift Area Supervisor.
Supervisor immediately notifies local agencies about possible exceedance.
Operator calls in a 3333.
Operator documents the event with a Malfunction/Breakdown Report.
Supervisor notifies Environmental Department.

Revision -- Removed

6) Event: A or B Train Oxidizer Stack Temperature fall below 875 °F.

Action: Operator immediately notifies Shift Area Supervisor.
Operator calls in a 3333.
Operator documents the event with a Malfunction/Breakdown Report.
Supervisor notifies Environmental Department.

Section 11 – Process Hazard Analysis Evaluations

Original --

Hazop A&B Train Tail Gas Unit Project
Hazop Revalidation on C and D Trains (2004)
Hazop Revalidation on A and B Trains, MEA Regenerators, Sour Water Strippers (2003)
Tier II Project Hazop (2000)

Revision --

Hazop MDEA Project (2009)
Hazop A&B Train Tail Gas Unit Project
Hazop Revalidation on C and D Trains (2004)
Hazop Revalidation on A and B Trains, MEA Regenerators, Sour Water Strippers (2007)
Tier II Project Hazop (2000)

Section 12 – Optimization Studies / Incident Report Root Cause Analyses

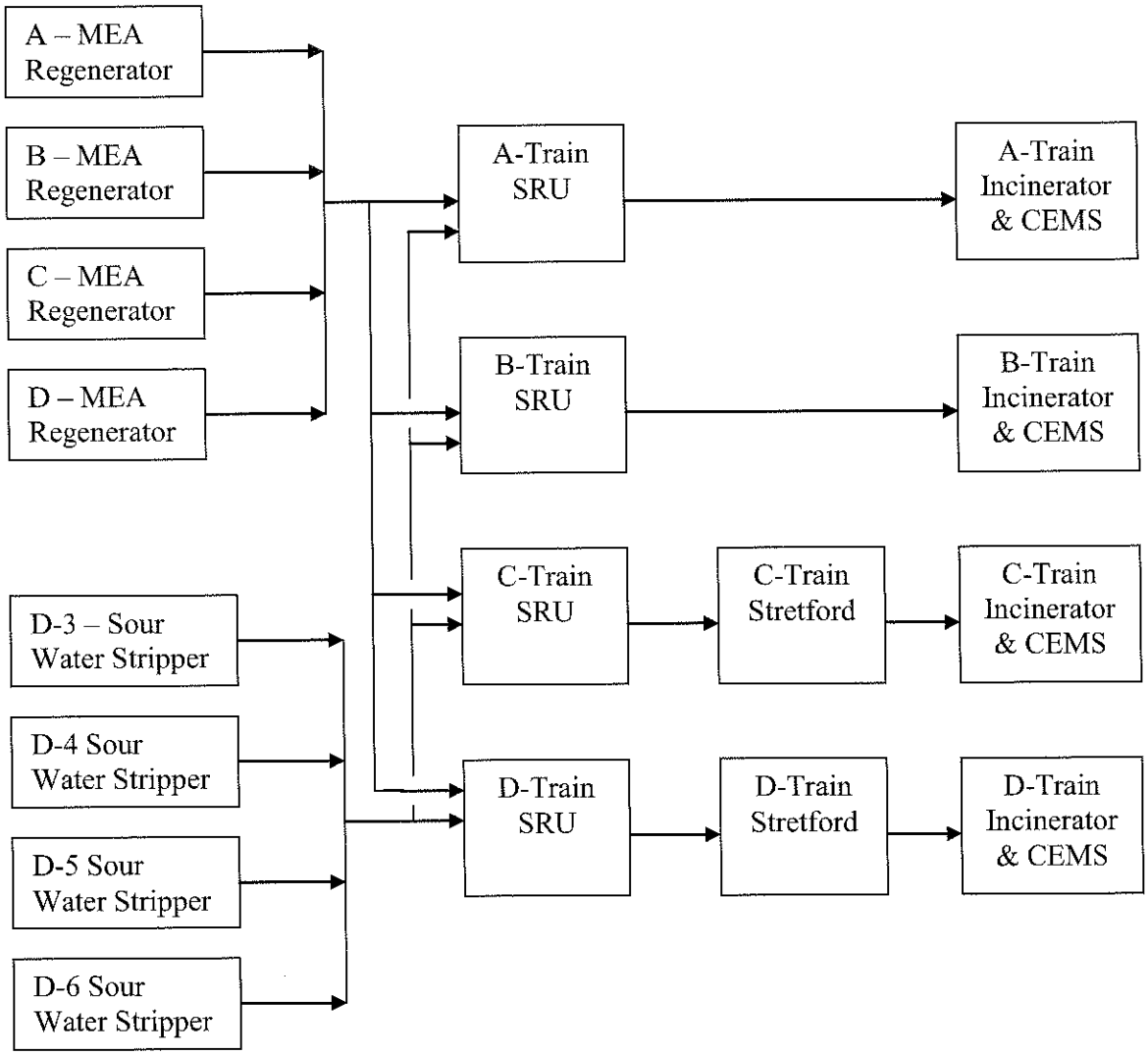
Revision -- Added

An acid gas flaring event at 844C-2 occurred February 4, 2007 (12:46 – 14:00) when C & D train tripped. Rod Sweer was the lead investigator. Copies of the Investigation Report 070204 are provided upon request.

Lemont Refinery
CITGO Petroleum Corporation
Semi-Annual Report
January 1, 2005 – December 31, 2011

Appendix A – Lemont Refinery Sulfur Recovery Complex Simplified Operating Flow Scheme

Original --



Revision -

Appendix B Start-up and Shutdown Procedures

Procedure #	Procedure Title	Modification to PMO Plan
119725-A	119726 – "B" Train Startup Procedure Following a Complete Burnoff or Catalyst Change	Procedure Number & Title updated
119748	**119748 - Restarting A Train to TGU after a Train Trip**	New Procedure
119750	**119750 - TGU Fill, Circulate and Establish Flow**	New Procedure
121730-A	121730 "C" Train Startup (Without Adequate Burnoff)	Procedure Number Update
121730-B	121732 - "D" Train Startup Procedure (Without Adequate Burnoff)	Procedure Number Update

Appendix C Lemont Refinery SRC Emergency Operating Procedures

Procedure #	Procedure Title	Modification to PMO Plan
119500	119500 - Responding to a H2S Alarm	Procedure Title Update
119551	119551 - TGU Loss of Booster Blower	New Procedure
121501	121501 - Loss of Stretford Circulation	Procedure Title Update
121509 -B	**121509 - Emergency Shutdown With No Evacuation**	Procedure Number Update
121510	121510 Oxygen Shutdown at C Train	Deleted
121511	121511 - Oxygen Shutdown at D Train	Deleted
121512	121512 - Responding to a Sulfur Pit Fire	Procedure Title Update

02/02/2010 Revision 10

Section 1 – Lemont Refinery Sulfur Recovery Complex Overview

Original --

Two (19D-1A and 19D-1B) are designed to process 450 GPM of amine solution and the other two (19D-401C and 19D-401D) are designed to process 900 GPM of amine solution. Each ARU is independent with their own rich amine flash drum, lean and rich amine exchangers. The ARU's provide lean amine to and receive rich amine from the refinery amine header. There are a total of thirteen absorbers on the refinery amine header, each listed below. The North Plant Coker Recycle Gas and South Plant Coker Wet Gas Absorbers are not in service.

Revision --

Two (19D-1A and 19D-1B) are designed to process 450 GPM of amine solution and the other two (19D-401C and 19D-401D) are designed to process 900 GPM of amine solution. The feed for all four ARUs comes through an oil separator that flashes and scrubs light hydrocarbons and decants off heavier hydrocarbons. Each ARU is independent with their own rich amine flash drum, and lean/rich amine exchangers. The ARU's provide lean amine to and

receive rich amine from the refinery amine header. There are a total of thirteen absorbers on the refinery amine header, each listed below. The South Plant Coker Wet Gas Absorber is not in service

Original --

The D-6 Tower typically process high-cyanide sour water.

Revision --

The D-6 Tower typically processes high-cyanide sour water.

Section 2 – Sulfur Shedding Procedure

Original --

1. Use available SRU/MEA capacity
2. Stop LCO feed at the Diesel Hydrotreater (U25)
3. Reduce feed to Coker (U13)
4. Reduce Feed to North Plant Coker (U08)
5. Stop LCO feed to FCC first, then Reduce LCGO (U12)
6. Reduce feed to ISAL
7. Reduce feed to Crude (U11)
8. Reduce Catalytic Reformer feed (U14)
9. Reduce LCGO feed to Diesel Hydrotreater (U25)

Revision --

1. Use available SRU/MEA capacity
2. Stop LCO feed at the Diesel Hydrotreater (U25)
3. Reduce feed to Coker (U13)
4. Reduce Feed to North Plant Coker (U06)
5. Stop LCO feed from FCC (U12) to Diesel Hydrotreater (U25)
6. Stop LCO feed to FCC first, then Reduce LCGO (U12)
7. Reduce feed to ISAL
8. Reduce feed to Crude (U11)
9. Reduce LCGO feed to Diesel Hydrotreater (U25)

Section 6 – Mechanical Upgrades and Installations

Original --

MEA System

1) MEA/Oil Separator

   Installed a new MEA/ oil separator in 2002 to reduce the likelihood of hydrocarbon from entering the SRU's. Hydrocarbon entering the SRU's can result in unit upsets or even pluming.

2) Metallurgy Upgrades:

Piping in high temperature MEA service (piping between the regenerator / reboiler and the regenerator / bottoms cooler) will be upgraded to stainless steel. This is to reduce corrosion.

Revision --

MEA System

1) MEA/Oil Separator
   Installed a new MEA/ oil separator in 2002 to reduce the likelihood of hydrocarbon from entering the SRU's. Hydrocarbon entering the SRU's can result in unit upsets or even pluming.
2) Metallurgy Upgrades:
   Piping in high temperature MEA service (piping between the regenerator / reboiler and the regenerator / bottoms cooler) was upgraded to stainless steel. This is to reduce corrosion.
3) MEA Bottoms Cooler Upgrade:
   The headbox and inlet nozzle thicknesses on 19E-404C, C Regenerator Bottoms Cooler were increased and tube inserts were installed to help reduce corrosion. (2009)

Original --

Planned Upgrades and Installations

Along with the changes and upgrades in place, there are plans in place to perform several more changes and upgrades, which are planned to be implemented between 2009 and 2011.

1) MEA Conversion to MDEA
   This project will convert the refinery amine system into a system that instead will use a tertiary amine. The new amine will allow for increased concentration and higher rich solvent loadings, which can greatly reduce the system circulation, save energy, and unload the capacity-limiting lean amine cooling system.
2) Medium Level Oxygen Enrichment
   C and D Train Front End Burners for the combustion furnace will be modified to accommodate medium level oxygen enrichment. Modifications will add additional capacity to both C and D Train.
3) Autoclave Improvements
   This project will cover installing controtrace on the overhead piping of C & D Autoclaves.
4) Replace Stretford Isolation valves and Balance Tank
   This project will cover changing out the isolation valves between the oxidizer tanks and between the balance tank and the oxidizer tanks. This will allow the tanks to be worked on without slowing down the refinery. Also the Balance tank needs to be replaced.
5) pH meter reliability
   This project will cover upgrading the current pH meters on the C & D contact condensers.
6) D-Train Nitrogen Purge Configuration
   This project will update purge timers for C&D trains.
7) D-Train Combustor Fuel Gas Regulator Hand Wheel

This project will cover installing a hand wheel on the fuel gas regulator for D combustor. This will allow D-Train to continue running while doing maintenance on this regulator.

Revision --

Planned Upgrades and Installations

Along with the changes and upgrades in place, there are plans in place to perform several more changes and upgrades, which are planned to be implemented between 2010 and 2011.

1) MEA Conversion to MDEA

This project will convert the refinery amine system into a system that instead will use a tertiary amine. The new amine will allow for increased concentration and higher rich solvent loadings, which can greatly reduce the system circulation, save energy, and unload the capacity-limiting lean amine cooling system.

2) Medium Level Oxygen Enrichment

C and D Train Front End Burners for the combustion furnace will be modified to accommodate medium level oxygen enrichment. Modifications will add additional capacity to both C and D Train.

3) Autoclave Improvements

This project will cover installing controtrace on the overhead piping of C & D Autoclaves.

4) Replace Stretford Isolation valves and Balance Tank

This project will cover changing out the isolation valves between the oxidizer tanks and between the balance tank and the oxidizer tanks. This will allow the tanks to be worked on without slowing down the refinery. Also the Balance tank needs to be replaced.

5) D-Train Nitrogen Purge Configuration

This project will update purge timers for C&D trains.

6) D-Train Combustor Fuel Gas Regulator Hand Wheel

This project will cover installing a hand wheel on the fuel gas regulator for D combustor. This will allow D-Train to continue running while doing maintenance on this regulator.

7) Board Monitoring of Stretford Air Flow

This project will cover installing three transmitters to monitor the air flow to all three Stretford oxidizer tanks.

8) Board Monitoring of Stretford Heater Flow

This project will cover installing a transmitter to monitor the Stretford flow to the Stretford heater. Ensuring that this flow is maintained will help maintain proper chemical concentration in the Stretford.

9) C Train Steam Turbine knockout drum

This project will cover installing a knockout drum to remove any water from the 220# steam caused during boiler upset conditions. This will prevent train trips due to wet steam.

10) C/D Train Pressure Switch Low Shutdown

This project will cover installing transmitters to replace the current level switches (19LS-339/1339). This will allow troubleshooting of this instrument and prevent

train trips due to instrument failure.

11) Autoclave Direct Steam Injection Pulsation Dampening

This project will cover installing a permanent system to reduce pressure hammer caused by steam condensation in the autoclave feed lines. This will provide for improved reliability of Stretford froth pumps, and pump discharge line rupture disks and check valves.

Section 9 – Critical Operating Variables

Original --

Condition	Method of Monitoring	Actions
High Reading on Fuel Gas H2S Analyzer	• DCS Display • High alarm on Fuel Gas H2S at 159 ppm	• Troubleshoot Process • Verify Proper MEA regeneration • Verify Correct MEA Fuel Gas Absorber Rates • Verify Max Lean MEA Cooling • Notify Shift/Unit Supervisor for additional moves
High Reading on Train SO2 Analyzers	• DCS Display • High alarm on CEMS SO2 at 250 ppm for a 1 hour average	• Troubleshoot Process • Alert Analyzer Group and have them verify accuracy of meters • Route MEA Gas to other Trains if possible • Notify Shift/Unit Supervisor
Flaring of Sour Water or MEA Acid Gas	• DCS Display • Flow Meter on Sour Water Gas Vent and MEA Acid Gas Vent • Deviation and High pressure alarm on MEA Acid Gas • Deviation alarm on Sour Water Gas	• Troubleshoot Process • Notify Shift/Unit Supervisor • Cut H2S Production per Sulfur Shedding Procedure if necessary
Tail Gas Oxidizer Stack Temperature Falls Below 875°F	• DCS Display • Temperature on Tail Gas Oxidizer Stack • Low alarm on Tail Gas Oxidizer Stack Temperature	• Troubleshoot Process • Route MEA Gas to other Trains if possible • Notify Shift/Unit Supervisor

Revision --

Condition	Method of Monitoring	Actions
High Reading on Fuel Gas H2S Analyzer	• DCS Display • High alarm on Fuel Gas H2S at 159 ppm	• Troubleshoot Process • Verify Proper MEA regeneration • Verify Correct MEA Fuel Gas Absorber Rates • Verify Max Lean MEA Cooling • Verify Min Lean MEA flow to 19F-21C scrubbing section • Notify Shift/Unit Supervisor for additional moves
High Reading on Train SO2 Analyzers	• DCS Display • High alarm on CEMS SO2 at 250 ppm for a 1 hour average	• Troubleshoot Process • Alert Analyzer Group and have them verify accuracy of meters • Route MEA Gas to other Trains if possible • Notify Shift/Unit Supervisor
Flaring of Sour Water or MEA Acid Gas	• DCS Display • Flow Meter on Sour Water Gas Vent and MEA Acid Gas Vent • High pressure alarm on MEA Acid Gas	• Troubleshoot Process • Notify Shift/Unit Supervisor • Cut H2S Production per Sulfur Shedding Procedure if necessary
Tail Gas Oxidizer Stack Temperature Falls Below 875°F	• DCS Display • Temperature on Tail Gas Oxidizer Stack • Low alarm on Tail Gas Oxidizer Stack Temperature	• Troubleshoot Process • Route MEA Gas to other Trains if possible • Notify Shift/Unit Supervisor

Section 11 – Process Hazard Analysis Evaluations

Original --

Hazop MDEA Project (2009)

Hazop Revalidation on A and B Trains, MEA Regenerators, Sour Water Strippers (2007)

Hazop A&B Train Tail Gas Unit Project (2007)
Hazop Revalidation on C and D Trains (2004)
Tier II Project Hazop (2000)

Revision --

Hazop Revalidation C and D Trains, and Beavon Tail Gas Unit (2009)
Hazop MDEA Project (2009)
Hazop Revalidation on A and B Trains, MEA Regenerators, Sour Water Strippers (2007)
Hazop A&B Train Tail Gas Unit Project (2007)
Hazop Revalidation on C and D Trains (2004)
Tier II Project Hazop (2000)

Section 12 – Optimization Studies/Incident Report Root Cause Analysis

Original --

Below are the official incident report root cause analyses completed since 2004 on each system related to the Sulfur Recovery Complexes:

An acid gas flaring event at 844C-2 occurred November 21, 2008 (21:52) when an operator error tripped D train. Andy Kobler was the lead investigator. Copies of the Investigation Report 112108 are provided upon request.

Revision --

Below are the official incident report root cause analyses completed since 2004 on each system related to the Sulfur Recovery Complexes:

A off-ratio train event occurred August 11, 200 (3:00) when an operator error caused both C and D trains to go off ratio. Matt Cordina was the lead investigator. Copies of the Investigation Report 081009 are provided upon request.

An acid gas flaring event at 844C-2 occurred November 21, 2008 (21:52) when an operator error tripped D train. Andy Kobler was the lead investigator. Copies of the Investigation Report 112108 are provided upon request.

Revision -

Appendix B Start-up and Shutdown Procedures

Procedure #	Procedure Title	Modification to PMO Plan
119602	A Sulfur Train Acid Gas and Natural Gas Heat Soak and Shutdown for Turbine Uncoupled Trip Testing	New Procedure
119604	B Sulfur Train Hot Shutdown and Restart to Natural Gas Heat Soak	New Procedure
119614	119614 – A Train Shutdown Procedure	Procedure Removed
119616	(D-3, D-4, D-5) Sour Water Stripper Shutdown	Procedure Title updated
119631	(D-6) SW Stripper Shutdown	Procedure Title updated
119707	(D-3) Sour Water Stripper Start-Up	Procedure Title updated
119708	(D-4) Sour Water Stripper Start-Up	Procedure Title updated
119709	(D-5) Sour Water Stripper Start-Up	Procedure Title updated
119712	(D-6) Sour Water Stripper Start-Up	Procedure Title updated
119724-B	119/724 D-6 Sour Water Stripper Start-up	New Procedure
119725-B	119/725 F401C Startup Procedure	New Procedure
119729	119729 - Regenerator Startup	Procedure Removed
119730	"A" Sulfur Train Start-up after Shutdown	New Procedure
119731	"B" Sulfur Train Start-up after Shutdown	New Procedure
121633	"C" Sulfur Train Hot Shutdown	Procedure Title updated
121634	"D" Sulfur Train Hot Shutdown	Procedure Title updated
121702	121/702 "D" Train/BSRP Refractory Dry-Out Procedure	New Procedure
121723	"C" Train Hot Start-up	Procedure Title updated
121/702	121/702 "D" Train/BSRP Refractory Dry-Out Procedure	Procedure Removed

Appendix C Lemont Refinery SRC Emergency Operating Procedures

Procedure #	Procedure Title	
119501	"A" or "B" Train Oxidizer Flameout or Low Oxidizer Temp	Procedure Title updated
121421	121510 Oxygen Shutdown at C Train	New Procedure
121422	121511 - Oxygen Shutdown at D Train	New Procedure
121500	Refinery Sulfur Train Load Shedding	Procedure Title updated
121501	121501 - Loss Of Stretford Circulation	Procedure Title updated
121507	Reaction to C or D Train Trip	Procedure Title updated

07/28/2010 Revision 11

Section 2 – Sulfur Shedding Procedure

Original --

The following plan will be implemented in the event that planned/unplanned shutdowns, emergency

shutdowns, or malfunctions result in excess SRU feed gas or a reduction in MEA processing capacity. These measures shall be taken as soon as possible to reduce emissions as quickly as practicable.

10. Use available SRU/MEA capacity
11. Stop LCO feed at the Diesel Hydrotreater (U25)
12. Reduce feed to Coker (U13)
13. Reduce Feed to North Plant Coker (U06)
14. Stop LCO feed from FCC (U12) to Diesel Hydrotreater (U25)
15. Stop LCO feed to FCC first, then Reduce LCGO (U12)
16. Reduce feed to ISAL
17. Reduce feed to Crude (U11)
18. Reduce LCGO feed to Diesel Hydrotreater (U25)

Operators and supervisors should maintain records of what actions were taken in accordance with this plan. This plan is encompassed in the following procedure and covers a range of events that require sulfur load shedding.

121500 - Refinery Sulfur Train Load Shedding Procedure

Revision --

A procedure is in place to handle sulfur load shedding. This plan is encompassed in the following procedure and covers a range of events that require sulfur load shedding.

121500 - Refinery Sulfur Train Load Shedding Procedure

The plan laid out in the above procedure will be implemented in the event that planned/unplanned shutdowns, emergency shutdowns, or malfunctions result in excess SRU feed gas or a reduction in MEA processing capacity. The procedure will be implemented by the Udex board, which is not otherwise involved in load shedding. These measures shall be taken as soon as possible to reduce emissions as quickly as practicable.

Operators and supervisors will maintain records of what actions were taken in accordance with this plan. The load shed procedure is available on the prism computer system and the most recent copy is posted at the Udex board. This procedure, which is updated periodically, will not be updated in this manual since the current sheets will be available on the computer network.

Section 6 – Mechanical Upgrades and Installations

Revision -- Added <u>Planned Upgrades and Installations</u>

12) C/ D Train Pit Vent Rerouting
This project will moving the pit vent nozzles on the combustors to prevent sulfur solidification in the nozzle and combustor and to allow a more reliable sweep flow.

13) C/ D Absorber Level and Pressure Drop Indication
This project will install level and pressure drop indication on C and D Absorbers to avoid premature shutdowns and reduced rates due to pressure build up.

14) C/D Train Low Pressure Shutdown Switches
This project will improve the reliability of the train low pressure shutdown switches.

15) Stretford Winter Thiosulfate Removal
This project will make it possible to remove thiosulfates in the winter and help avoid the upsets that occur due to high thiosulfate circulation.

Section 12 – Optimization Studies/Incident Report Root Cause Analysis

Revision -- Added

C Train Absorber Plugging event occurred April 1, 2010 (14:24) when an sulfur build-up in the bottom trays of the Absorber caused back pressure and reduced capacity on the train the ultimate shutdown for cleaning and repair. Joe Noreiko was the lead investigator. Copies of the Investigation Report 040110 are provided upon request.

Revision--

Appendix B Start-up and Shutdown Procedures

Procedure #	Procedure Title	Modification to PMO Plan
119603	"B" Sulfur Train Acid Gas and Natural Gas Heat Soak and Shutdown for Uncoupled Trip Testing	New
119604	"A" Sulfur Train Shutdown with Natural Gas Burnout	Title Change
119605	"B" Sulfur Train Shutdown with Natural Gas Burnout	New
119606	119606 119F-50 Condensate Drum Shutdown Procedure	Removed
119615	MEA Regenerator Shutdown and Clearing Procedure	Title Change
119703	119703 - 119F-21C MEA Separator Start-Up and Operating Procedure	Removed
119704	119704 - 119F-50 Condensate Drum Start-Up Procedure	Removed
119706	119706 – Start-Up Procedure For MEA Reclaimer E-405	Removed
119707	(D-3) Sour Water Stripper Start-Up	Removed
119708	(D-4) Sour Water Stripper Start-Up	Removed
119709	(D-5) Sour Water Stripper Start-Up	Removed
119710	119710 – Restarting A or B Train after Tripping out	Removed
119711	119711 – A-Train Startup After Burn Off or Catalyst Change Out	Removed
119712	(D-6) Sour Water Stripper Start-Up	Removed
119713	119713 – 19D-1B MEA Regenerator Start-Up Procedure	Removed
119714	119714 - 19D-401C MEA Rengenerator Start-Up Procedure	Removed
119715	119715 - 19D-401D MEA Regenerator Start-Up Procedure	Removed
119716	119716 – Sulfur Recovery Train Pre Start-Up Checklist	Removed
119717	"A" Sulfur Train Pre Start-Up Pressure Test After Major T/A	Title Change
119718	119718 "B" Sulfur Recovery Train Pre Start-Up Pressure Test	Removed
119719	Using a Portable Ignitor for Lighting Sulfur Train Burners.	Title Change

119724-B	119/724 D-6 Sour Water Stripper Start-up	Removed
119725-A	119726 – "B" Train Startup Procedure Following a Complete Burnoff or Catalyst Change	Removed
119725-B	119/725 F401C Startup Procedure	Removed
11926	Place the Amine Carbon Adsorber System in Service	New
119730	"A" Sulfur Train Start-up after Uncouple Trip Test or Turnaround	Title Change
119731	"B" Sulfur Train Start-up after Uncouple Trip Test or Turnaround	Title Change
119732	A Sulfur Train Pre Startup Pressure Test After Catalyst Changeout	New
119733	"B" Sulfur Train Pre-Startup Pressure Test After Catalyst Changeout	New
121629	C Train Shutdown with 3MM Low Low Combustion Air Flow Trip	New
121630	D Sulfur Train Shutdown with 3 MM Low Low Combustion Air Trip	New
121700	"C" Train Shutdown and Start-up to Natural Gas Operation	New
121701	"D" Train Shutdown and Start-up to Natural Gas Operation	New
121703	Presulfiding Procedure For "C" Train	Title Change
121704	Presulfiding Procedure For "D" Train	Title Change
121706	C or D Sulfur Recovery Train Pre Startup Pressure Test	Title Change
121721	C Train-BSRP Cold Start Procedure	Title Change
121722	D Train-BSRP Cold Start Procedure	Title Change
121725	"C" Sulfur Train Startup with 3 MMSCFD Low/Low Combustion Air Trip	New
121726	D" Sulfur Train Startup with the 3MM Low Low Air Trip	New
119/618	119/618 19F-3B MEA Precoat Filter Shutdown Procedure	Removed
119/622	119/622 19G-403E/404C Lean MEA Pump Shutdown Procedure	Removed
121/605	121/605 Shutting Down Autoclave 21D-5C	Removed
121/606	121/606 Shutdown And Clearing Of Converter Beds	Removed

Appendix C Lemont Refinery SRC Emergency Operating Procedures

Procedure #	Procedure Title	
119508	Responding to an H2S Alarm in the MDEA System	New
121421	121510 Oxygen Shutdown at C Train	Removed
121422	121511 - Oxygen Shutdown at D Train	Removed

1/25/11 Revision 12

Document-wide: Changed "MEA" to "Amine".

1.0 Lemont Refinery Sulfur Recovery Complex Overview
Added to absorber list:

- ULSD Hydrotreater Purge Gas
- ULSD Hydrotreater Recycle Gas

2.0 Sulfur Shedding Procedure

Added to Load Shed Procedure Description:
"To help facilitate quick implementation of the load shedding procedure, an alarm system has been implemented on the Udex board. When a sulfur train goes down, the Udex board gets an alarm indicating to them that the load shed procedure should be implemented."

6.0 Mechanical Upgrades and Installations

Added to C and D Train Section (Moved from Planned Upgrades and Installations Section):

- Medium Level Oxygen Enrichment
  C and D Train Front End Burners for the combustion furnace were modified to accommodate medium level oxygen enrichment. Modifications added additional capacity to both C and D Train.
- Replace Stretford Isolation valves and Balance Tank
  This project changed out the isolation valves between the oxidizer tanks and between the balance tank and the oxidizer tanks. Also the Balance tank was replaced.
- Board Monitoring of Stretford Air Flow
  - This project installed three transmitters to monitor the air flow to all three Stretford oxidizer tanks.
- Board Monitoring of Stretford Heater Flow
  This installed a transmitter to monitor the Stretford flow to the Stretford heater. Ensuring that this flow is maintained will help maintain proper chemical concentration in the Stretford.
- C/ D Train Pit Vent Rerouting
  This project moved the pit vent nozzles on the combustors to prevent sulfur solidification in the nozzle and combustor and to allow a more reliable sweep flow.
- D-Train Combustor Fuel Gas Regulator Hand Wheel
  This project installed a hand wheel on the fuel gas regulator for D combustor. This allows D-Train to continue running while doing maintenance on this regulator.
- C/D Train Pressure Switch Low Shutdown
  This project installed transmitters to replace the current level switches (19LS-339/1339). This allows for troubleshooting of this instrument and prevents train trips due to instrument failure.
- Permanent Stretford Purge
  This project installed a permanent 1.5 gpm Stretford purge to the waste water treatment plant. This purge helps control the accumulation of Thiosulfates in the Stretford and helps avoid Stretford chemistry upsets.
- Create Tags to Signal Sulfur Train Down
  This project created an alarm on the Udex board. If the Udex board operator gets this alarm, he is to communicate with the sulfur board operator to see if load shedding is necessary.
- C/D-Train Nitrogen Purge Configuration
  This project will update purge timers for C&D trains.

Added to Amine System Section (Moved from Planned Upgrades and Installations Section):

- MEA Conversion to MDEA
  In July 2010 this project started to convert the refinery amine system from MEA to MDEA; a tertiary amine. The new amine will allow for increased concentration and higher rich solvent loadings, which can greatly reduce the system circulation, save energy, and unload the capacity-limiting lean amine cooling system. Along with the conversions a coalescer, carbon absorber, ionic exchange resin skid for heat stable salt removal and additional filtration capacity was added to the amine circulation system.
- ULSD
  In July 2010 an Ultra Low Sulfur Diesel Hydrotreater unit was installed. This unit installed two additional amine absorbers to recover H2S gas from the purge gas and recycle gas streams.

Added to Planned Upgrades and Installations Section:

- Replace A Amine Regenerator Bottoms Coolers
  This project will replace the A regenerator bottoms coolers with a better metallurgy exchanger.
- Autoclave Overhead Pressure Protection
  This project will install a relief system on the autoclaves. The autoclaves are currently not sufficiently protected from overpressure.
- Install New Turbines or Buy Replacements for C and D Air Blower Turbines
  C and D Train air blower turbines are obsolete. This project will look into either buying a spare turbine or upgrading the turbines to a newer model. This will help in the lead time for parts in the case that the turbine goes down and needs maintenance.
- A and B Train Waste Heat Boiler Reliability
  This project will make the level indication shutdown for the waste heat boilers more reliable.
- Unit 121 SO2 Analyzers
  This project will install SO2 analyzers on C and D tail gas to the absorbers. Monitoring SO2 breakthrough will help to predict Stretford chemistry upsets.
- Unit 121 New H2S Monitors near Snorkels
  This project will install new H2S monitors near the snorkels of C and D Train air blowers, making it safer for operators in the case of backflow or plugging in C or D Train.
- DCS Logic to Prevent Emissions During Upset
  In the event that a "big" Train (either C or D Train) trips out, this logic will help to keep the other trains running by using front end pressure control of C or D Train.
- CEMS Isolation Valves
  This project will install isolation valves on the CEMS analyzers. Currently a line break is performed every time the CEMS analyzers are worked on. This project will allow for safer maintenance of the CEMS analyzers.
- 19P-318 - Bring New Indication to DCS
  The outlet pressure of the amine pumps will be routed to the Sulfur Board. This pressure indication will be trendable and will help operators to know when a pump is going bad or having trouble pumping.

12.0 Optimization Studies / Incident Report Root Cause Analyses

Added "MDEA Loss event occurred on 10/26/10 where Outfall 001 was shutdown for a period of 8 days to avoid ammonia permit exceedance for plant effluent to Chicago Ship & Sanitary Canal. Larry Tyler was the lead investigator. Copies of the Investigation Report Incident 26033 are provided upon request."

13.0 PMO Plan Responsibilities

Changed contact information: Erica Havekost, Sulfur Operations Process Engineer, 630-296-2974, ehaveko@citgo.com

Appendix B Start-up and Shutdown Procedures

Added as new:

119707	(D-3) Sour Water Stripper Start-Up
119708	(D-4) Sour Water Stripper Start-Up
119709	(D-5) Sour Water Stripper Start-Up
119712	(D-6) Sour Water Stripper Start-Up
119713	Start-Up (19D-1B) MEA Regenerator
119714	(19D-401C) MEA Regenerator Start-Up
119715	(19D-401D) MEA Regenerator Start-Up
121635	"C" Sulfur Train Startup on Natural Gas and Burnout to Allow Shutdown
121636	"D" Sulfur Train Startup on Natural Gas and Burnout to Allow Shutdown
121727	"C" Sulfur Train Hot Start with 3 MM Low / Low Combustion Air Trip
121728	"D" Sulfur Train Hot Start-Up with 3 MM Low / Low Combustion Air Trip

Removed (Inactive Procedures):

119613	119613 - Regenerator Shutdown Procedure
119617	119617 19F-3A MEA Filter Shutdown Procedure
119623	119623 – B Train Shutdown Procedure
119717	"A" Sulfur Train Pre Start-Up Pressure Test After Major T/A
119720	119720 19F-3A MEA Filter Start-Up Procedure
119727	119727 - 19D-1A Regenerator Start-Up Procedure
121621	121621 - C Train BMS Initiated Shutdown
121622	121622 D Train BMS Initiated Shutdown
121631	121631 - C Train Normal Shutdown Procedure
121632	121632 - D Train Normal Shutdown Procedure
121633	"C" Sulfur Train Hot Shutdown
121634	"D" Sulfur Train Hot Shutdown
121702	121/702 "D" Train/BSRP Refractory Dry-Out Procedure
121703	Presulfiding Procedure For "C" Train
121704	Presulfiding Procedure For "D" Train
121705	121705 - C or D Train Pre Start-Up Checklist
121706	C or D Sulfur Recovery Train Pre Startup Pressure Test
121723	"C" Train Hot Start-up
121724	121724 - D Train Hot Start Procedure

121725	"C" Sulfur Train Startup with 3 MMSCFD Low/Low Combustion Air Trip
121726	D" Sulfur Train Startup with the 3MM Low Low Air Trip
121730-A	121730 "C" Train Startup (Without Adequate Burnoff)
121730-B	121732 - "D" Train Startup Procedure (Without Adequate Burnoff)
121/701	121/701 "C" Train/BSRP Refractory Dry-Out Procedure
121-725	121-725 Introduction of Oxygen to C Train
121-726	121-726 Introduction of Oxygen to D Train

Appendix C Lemont Refinery SRC Emergency Operating Procedures
Removed (Inactive Procedures):

121515	121515 - D Sulfur Train Shutdown with C Sulfur Train in T/A
121-423	121-423 Prepare Oxygen lines for Maintenance

7/15/2011 Revision 13

6.0 Changes

Upgrades and Installations Already in Place

C & D Trains

1) C/D-Train Nitrogen Purge Configuration
   This project updated the purge timers for C&D trains.
2) C Train Steam Turbine knockout drum
   This project covered the installation of a knockout drum to remove any water from the 220# steam caused during boiler upset conditions. This will prevent train trips due to wet steam.
3) Autoclave Direct Injection Pulsation Dampening
   This project covered installation of a permanent system to reduce pressure hammer caused by steam condensation in the autoclave feed lines. This will provide for improved reliability of Stretford froth pumps, and pump discharge line rupture disks and check valves.
4) Unit 121 SO2 Analyzers
   This project covered installation of SO2 analyzers on C and D tail gas to the absorbers. Monitoring SO2 breakthrough will help to predict Stretford chemistry upsets.

Amine System

1) 19P-318 - Bring New Indication to DCS
   The outlet pressure of the amine pumps is routed to the Sulfur Board. This pressure indication is trendable and will help operators to know when a pump is going bad or having trouble pumping.

Planned Upgrades and Installations

1) Replace B Amine Regenerator Bottoms Coolers
   This project will replace the B regenerator bottoms coolers with a better metallurgy exchanger.

2) Sulfur Reliability Project 2012
    1) Improve Autoclave Overhead Quench Control
    2) Monitor Autoclave Packing Pressure Drop
    3) Improve Flow Control on C & D Train RGG for Presulfiding & Natural Gas Mode
    4) Improve Flow Control on C & D Train Main & Trim Air
    5) Improve C & D Sulfur Train Controls with Pneumatic Indication
    6) Install Level Indication for Sulfur Condensers
    7) Install Flow Indication on N2 for A & B Train
    8) Install Nuclear Level Indication on C & D Train Stretford Absorbers
    9) Install Skimmer Pump Flow Indication
    10) Install A & B Train Hot Gas Bypass Valve Position Indication
3) Install constant caustic addition for Stretford
4) Upgrade E2T on all trains
5) Upgrade TK-50 knife gate valves
6) Rerange Natural Gas Flow Meter on 119 RGG

Added Procedures to Appendix B & C:

119509	Emergency Shutdown With No Evacuation
119510	Response to a Low Sulfur Pit Sweep Flow
119716	Sulfur Recovery Train Pre Start-Up Checklist
119727	Start-up (19D-1A) MEA Regenerator
119749	Restart "B" Train to TGU after a Train Trip
121505	Low Combustor Temperature and/or Combustor Flameout
121510	Response to a Low Sulfur Pit Sweep Flow
121600	"C" Train Natural Gas Hot Shutdown With 3MM Low/Low Combustion Air Flow Trip
121601	"D" Train Natural Gas Hot Shutdown with 3MM Low/Low Air Flow Trip
121/605	121/605 Shutting Down Autoclave 21D-5C
121/701	121/701 "C" Train/BSRP Refractory Dry-Out Procedure
121715	"C" Train Start-up with Natural Gas/Burnout/Shutdown
121716	"D" Train Start-up with Natural Gas/Burnout/Shutdown

1/12/2012 Revision 14

Changes:

6.0 ***Mechanical Upgrades and Installations***

Upgrades and Installations Already in Place

General Sulfur Unit

- Implemented Safe Operating Limits for sulfur complex (2011)
- Revised "High H2S in FG procedure" (2011)
- Implemented new procedure for all train shutdowns. (2011)

    This procedure utilizes N2 cooling and significantly reduces SO2 emissions during train shutdowns.

C & D Trains

- DCS Logic to Prevent Emissions During Upset (2011)
  In the event that a "big" Train (either C or D Train) trips out, this logic will help to keep the other trains running by using front end pressure control of C or D Train.

A and B Trains

- Rerange Natural Gas Flow Meter on 119 RGG (2011)

Amine System

- Discontinue use of antioxidant injection (2011)
- Upgrade ion exchange cycle timing and caustic/water reservoir level indication, install filter on instrument air to ion exchange skid, and install pressure transmitters to measure resin bed DP (2011)

Sour Water System

- Install antifoulant injection on D-5 Sour water stripper to prevent fouling from clay/silt (2012)

Planned Upgrades and Installations

- Planed repairs for 19TK-401
- H2S monitor standardization of alarms, horn signals, strobes
- Replace A Train TGU valves
- Changing Low Combustion Air Flow SIS trips on C and D Train

Appendix B Start-up and Shutdown Procedures

Additions

119607	"A" Sulfur Train Shutdown with Natural Gas Heat Soak and Nitrogen Cooldown
119608	"B" Sulfur Train Shutdown with Natural Gas Heat Soak and Nitrogen Cooldown
121703	Presulfiding "C" and "D" Train
121705	"C" or "D" Train Pre Start-up Checklist
121706	C or D Sulfur Recovery Train Pre Startup Pressure Test
121707	"C" Train Walkthrough Checklist
121712	Nitrogen Purge and Pressure Test (21F-1C) Amine K.O. Drum

Deletions

119604	"A" Sulfur Train Shutdown with Natural Gas Burnout
119605	"B" Sulfur Train Shutdown with Natural Gas Burnout
119719	Using a Portable Igniter for Lighting Sulfur Train Burners.
119721	119721 19F-3B MEA Precoat Filter Start-Up Procedure
121629	C Train Shutdown with 3MM Low Low Combustion Air Flow Trip
121630	D Sulfur Train Shutdown with 3 MM Low Low Combustion Air Trip
121715	"C" Train Start-up with Natural Gas/Burnout/Shutdown
121716	"D" Train Start-up with Natural Gas/Burnout/Shutdown
121721	C Train-BSRP Cold Start Procedure
121722	D Train-BSRP Cold Start Procedure

Lemont Refinery
CITGO Petroleum Corporation
Semi-Annual Report
July 1, 2011 – December 31, 2011

Attachment 6

Flaring Incidents

Lemont Refinery
CITGO Petroleum Corporation
Hydrocarbon Flaring RCFA Status Summary
July 1, 2011 – December 31, 2011

Incident Date	Incident Number	RCFA Completed	Corrective Action Completion Date	Corrective Action Expected Completion Date	Comments
7/25/2011	LE-HC-02-2011-072511	9/12/2011	8/2011	8/2011	Appendix A
8/12/2011	LE-HC-03-2011-081211	9/12/2011	08/2011	08/2011	Appendix B
9/13/2011	LE-HC-04-2011-091311	10/19/2011	9/14/2011	9/14/2011	Appendix C
9/13/2011	LE-HC-04-2011-091311	10/19/2011	9/15/2011	9/15/2011	Appendix C
9/13/2011	LE-HC-04-2011-091311	10/19/2011	12/15/2011	12/31/2011	Appendix C

CITGO Petroleum Corporation
Lemont Refinery
Hydrocarbon Flaring Incident Summary – 7/25-8/9/11
RCA Completed 9/12/2011

Incident Number: LE-HC-2-2011-072511

Brief Description of Incident

At approximately 7:23 A.M. on July 25, 2011 flaring began at elevated flares 844C-2 and 844C-3 after the 844GB-401 South Plant Flare Gas Recovery Compressor was shutdown to perform planned maintenance and inspection of the compressor. This shutdown was a planned maintenance activity, pursuant to Condition 7.7.5.b. of the refinery's Clean Air Act Permit Program (CAAPP) permit no. 96030079 (otherwise known as "Title 5" operating permit). The maintenance was initiated based on run length and indicators used to determine the need to inspect and overhaul the compressor. The prior compressor maintenance event occurred on October 6, 2008. The primary scope of this maintenance outage was to replace valves, piston assemblies, bearings, relocate the main frame circulating lube oil sample location and rebuilds of the compressor unloaders.

After the work was completed and the equipment purged and pressure-tested, the compressor was re-started and flaring ended at 9:04 A.M. on August 9, 2011.

The flare gas recovery rate is independent of the unit charge rates, and is more a function of normal purges and reliefs. Accordingly, reliefs and purges to the flare were minimized prior and during the shutdown, and refinery operations were held stable during the outage. Flare steam to gas ratio was monitored for control. The work was planned so that necessary materials were available prior to the commencement of the work, and work progressed continuously throughout the shutdown.

C-2 – intermittent flaring with more than 500 lb SO2 in 24 hrs.

Incident Start Date:	07/25/11	**Incident Start Time:**	07:23
Incident End Date:	08/09/11	**Incident End Time:**	07:57

Estimated SO_2 Emissions:	9.9 tons	**Estimated SO_2 Emission Rate:**	51.4 lbs/hr

C-3 – intermittent flaring with more than 500 lb SO2 in 24 hrs.

Incident Start Date:	07/25/11	**Incident Start Time:**	07:23
Incident End Date:	08/09/11	**Incident End Time:**	09:04

Estimated SO_2 Emissions:	134.3 tons	**Estimated SO_2 Emission Rate:**	697.3 lbs/hr

Combined C-2, C-3 total: 144.2 tons SO2

CITGO Petroleum Corporation
Lemont Refinery
Hydrocarbon Flaring Incident Summary – 7/25-8/9/11
RCA Completed 9/12/2011

Calculations per Paragraph 92

C-2 flaring

Tons of SO_2 Emitted = [FR][TD][ConcH_2S][8.44 x 10^{-5}]
= [39,906 SCFH] [384.57 hrs] [0.00762 scf H_2S/scf gas] [8.44 x 10^{-5}] = 9.9 Tons SO_2

Rate of SO_2 emissions in lbs/hr = [FR][ConcH_2S][0.169]
= [39,906 SCFH] [0.00762 scf H_2S/scf gas] [0.169] = 51.4 lbs of SO_2/hr

C-3 flaring

Tons of SO_2 Emitted = [FR][TD][ConcH_2S][8.44 x 10^{-5}]
= [541,441 SCFH] [385.68 hrs] [0.00762 scf H_2S/scf gas] [8.44 x 10^{-5}] = 134.3 Tons SO_2

Rate of SO_2 emissions in lbs/hr = [FR][ConcH_2S][0.169]
= [541,441 SCFH] [0.00762 scf H_2S/scf gas] [0.169] = 697.3 lbs of SO_2/hr

Meanings of variables and derivation of multipliers used in the above equations are as listed in paragraph 92.c. of the Consent Decree

Steps taken to limit the duration and/or quantity of sulfur dioxide emissions

Reliefs to the flare header and purges were minimized prior to and during the compressor maintenance period and refinery operations were held steady during the period. Necessary parts were on-hand prior to commencing the work, and the work was performed continuously throughout the maintenance period.

Root Cause and significant contributing cause(s)

Root-causes:

1) **Planned Maintenance Outage**. This was a planned maintenance outage, consistent with Paragraph 75.a. of the Consent Decree in which "The Parties recognize that periodic maintenance may be required for properly designed and operated flare gas recovery systems." The three prior maintenance outages had been on October 6, 2008 (13 days – 1st stage overhaul), April 2007 (6 days – partial compressor inspection and overhaul), and June 2005 (aftercooler exchanger maintenance). This outage was necessary to ensure continued good compressor operations.

CITGO Petroleum Corporation
Lemont Refinery
Hydrocarbon Flaring Incident Summary – 7/25-8/9/11
RCA Completed 9/12/2011

Measures to prevent a recurrence of a similar event and proposed corrective actions

1. As recognized by Paragraph 75.a. of the Consent Decree, continue to monitor compressor conditions and perform periodic maintenance to ensure reliable compressor operations.

Action Commencement and Completion Dates

Action	Commencement Dates [mm/yr]	Target Completion Date [mm/yr]	Completion Dates [mm/yr]
1. Continue to monitor compressor conditions and perform periodic maintenance to ensure reliable compressor operations.	08/11		08/11

CITGO Petroleum Corporation
Lemont Refinery
Hydrocarbon Flaring Incident Summary – 7/25-8/9/11
RCA Completed 9/12/2011

Stipulated penalty determination statement

The stipulated penalty determination statement is not required for the 07/25/2011 Hydrocarbon Flaring Incident.

CITGO Petroleum Corporation
Lemont Refinery
Hydrocarbon Flaring Incident Summary – 8/12/11
RCA Completed 09/12/2011

Incident Number: LE-HC-3-2011-081211

Brief Description of Incident

At approximately 06:28 A.M. on August 12, 2011, flaring began at elevated flare, 844C-2, after the 844GB-401 South Plant Flare Gas Recovery Compressor was shutdown to due to an oil leak found after performing planned maintenance and inspection of the compressor July 25 through Aug 9, 2011. This shutdown was an extension of a planned maintenance activity, pursuant to Condition 7.7.5.b. of the refinery's Clean Air Act Permit Program (CAAPP) permit no. 96030079 (otherwise known as "Title 5" operating permit). The planned maintenance scope included replacement of valves, piston assemblies, bearings, relocating the main frame circulating lube oil sample location and rebuild of the compressor unloaders. After the compressor was started up, the first stage piston rod began leaking lube oil. This shutdown (8/12/2011) replaced the oil scrappers and wipers to mitigate the leak.

After the work was completed, the compressor was re-started and flaring ended at 10:53 A.M. on August 12, 2011.

The flare gas recovery rate is independent of the unit charge rates, and is more a function of normal purges and reliefs. Accordingly, reliefs and purges to the flare were minimized prior and during the shutdown, and refinery operations were held stable during the outage. Flare steam to gas ration was monitored for control. The work was planned so that necessary materials were available prior to the commencement of the work, and work progressed continuously throughout the shutdown.

C-2 – intermittent flaring with more than 500 lb SO2 in 24 hrs

Incident Start Date:	08/12/11	**Incident Start Time:**	06:28
Incident End Date:	08/12/11	**Incident End Time:**	10:53

Estimated SO_2 Emissions: 1.9 tons	**Estimated SO_2 Emission Rate:** 845.8 lbs/hr

Calculations per Paragraph 92

C-2 flaring

Tons of SO_2 Emitted = [FR][TD][ConcH_2S][8.44 x 10^{-5}]
= [493,562 SCFH] [4.42 hrs] [0.01014 scf H_2S/scf gas] [8.44 x 10^{-5}] = 1.9 Tons SO_2

Rate of SO_2 emissions in lbs/hr = [FR][ConcH_2S][0.169]

= [493,562 SCFH] [0.01014 scf H_2S/scf gas] [0.169] = 845.8 lbs of SO_2/hr

Meanings of variables and derivation of multipliers used in the above equations are as listed in

paragraph 92.c. of the Consent Decree

Steps taken to limit the duration and/or quantity of sulfur dioxide emissions

Reliefs to the flare header and purges were minimized prior and during the compressor maintenance period and refinery operations were held steady during the period. Necessary parts were on-hand prior to commencing the work, and the work was performed continuously throughout the maintenance period.

Root Cause and significant contributing cause(s)

Root-causes:

1) **Extension of Planned Maintenance Outage**. This was an extension of a planned maintenance outage, consistent with Paragraph 75.a. of the Consent Decree in which "The Parties recognize that periodic maintenance may be required for properly designed and operated flare gas recovery systems." This was an extension of the July 25, 2011 maintenance outage (16 days – piston and valve replacement). The three prior maintenance outages had been on October 6, 2008 (13 days – 1st stage overhaul), April 2007 (6 days – partial compressor inspection and overhaul), and June 2005 (aftercooler exchanger maintenance). This outage was necessary to ensure continued good compressor operations.

Measures to prevent a recurrence of a similar event and proposed corrective actions

1. As recognized by Paragraph 75.a. of the Consent Decree, continue to monitor compressor conditions and perform periodic maintenance to ensure reliable compressor operations.

Action Commencement and Completion Dates

Action	Commencement Dates [mm/yr]	Target Completion Date [mm/yr]	Completion Dates [mm/yr]

CITGO Petroleum Corporation
Lemont Refinery
Hydrocarbon Flaring Incident Summary – 8/12/11
RCA Completed 09/12/2011

1.	Continue to monitor compressor conditions and perform periodic maintenance to ensure reliable compressor operations.	08/11		08/11

CITGO Petroleum Corporation
Lemont Refinery
Hydrocarbon Flaring Incident Summary – 8/12/11
RCA Completed 09/12/2011

Stipulated penalty determination statement

The stipulated penalty determination statement is not required for the 08/12/2011 Hydrocarbon Flaring Incident.

CITGO Petroleum Corporation
Lemont Refinery
Hydrocarbon Flaring Incident Summary – 9/13/11 - 9/14/11
RCA Completed 10/19/11

Incident Number: LE-HC-4-2011-091311

Brief Description of Incident

At approximately 04:50 A.M. on September 13, 2011, flaring began at elevated flare, 844C-2, after the 844GB-401 South Plant Flare Gas Recovery Compressor was shutdown due to a small leak at an elbow on piping from 844F-404 knock-out drum. A pinhole leak was found in the elbow of the piping from the 2nd stage condensate knock-out drum (844F-404). The leak was not able to be isolated for repair so the flare gas recovery compressor was shutdown to isolate and repair the leak. Piping was replaced from the bottom of the condensate knock-out drum to the first isolation valve on vessel 844F-404.

Replaced piping was pressure checked and the compressor was re-started on 9/14/11 at approximately 10:28 P.M.

The flare gas recovery rate is independent of the unit charge rates, and is more a function of normal purges and reliefs. Accordingly, reliefs and purges to the flare were minimized during the shutdown, and refinery operations were held stable during the outage. Flare steam to gas ration was monitored for control.

C-2 – flaring with more than 500 lb SO2 in 24 hrs

Incident Start Date:	09/13/11	**Incident Start Time:**	04:50
Incident End Date:	09/14/11	**Incident End Time:**	10:28

Estimated SO_2 Emissions: 18.1 tons	**Estimated SO_2 Emission Rate:** 870.6 lbs/hr

Calculations per Paragraph 92

C-2 flaring

Tons of SO_2 Emitted = [FR][TD][ConcH_2S][8.44 x 10^{-5}]
= [512,582 SCFH] [41.63 hrs] [0.01005 scf H_2S/scf gas] [8.44 x 10^{-5}] = 18.1 Tons SO_2

Rate of SO_2 emissions in lbs/hr = [FR][ConcH_2S][0.169]

= [512,582 SCFH] [0.01005 scf H_2S/scf gas] [0.169] = 870.6 lbs of SO_2/hr

Meanings of variables and derivation of multipliers used in the above equations are as listed in paragraph 92.c. of the Consent Decree

CITGO Petroleum Corporation
Lemont Refinery
Hydrocarbon Flaring Incident Summary – 9/13/11 - 9/14/11
RCA Completed 10/19/11

Steps taken to limit the duration and/or quantity of sulfur dioxide emissions

Reliefs to the flare header and purges were minimized during the compressor shutdown period and refinery operations were held steady during the period. Repairs were progressed on a continuous basis until completed.

Root Cause and significant contributing cause(s)

Root-causes:

1) Corrosive pitting in the elbow of the piping, which ran from the bottom of the knock-out drum to the first isolation valve, resulted in a pinhole leak at the elbow of the piping.
2) Only a percentage of elbows, on this piping system, have a thickness measurement location (TML) and this location did not, but had not had a past failure. Piping run is approximately 1 ft in length.

Measures to prevent a recurrence of a similar event and proposed corrective actions

1. Replace piping from the bottom of knock-out drum to the first isolation valve.
2. Establish TML for elbow
3. Understand corrosion mechanism for failed elbow and evaluate the need to add TMLs, as appropriate, for the flare gas recovery system.

Action Commencement and Completion Dates

Action	Commencement Dates [mm/yr]	Target Completion Date [mm/yr]	Completion Dates [mm/yr]
1.	09/13/11		09/14/11
2.	09/14/11		09/15/11
3.	09/15/11	12/31/11	12/15/11

CITGO Petroleum Corporation
Lemont Refinery
Hydrocarbon Flaring Incident Summary – 9/13/11 - 9/14/11
RCA Completed 10/19/11

Stipulated penalty determination statement

The stipulated penalty determination statement is not required for the 09/13/2011 – 9/14/2011 Hydrocarbon Flaring Incident.

Lemont Refinery
CITGO Petroleum Corporation
Semi-Annual Report
July 1, 2011 – January 30, 2011

Attachment 7

Summary of BWON Requirements

Attachment 7 - EOL

3Q 2011

Sample Number	Equipment Description	Controlled/ Uncontrolled	Percent Aqueous	Percent Organic	Hydrocarbon Specific Gravity	Benzene Concentration Aqueous (mg/L)	Benzene Concentration Organic (mg/kg)	Total Benzene in Waste (ppmw)	Volume (gal/qtr)	6.0 Mg Compliance Option	Type of Sample
	North Plant										
13	Udex Lift Station Unit -122	Uncontrolled	100	0.0	0.728	0.13	0.00	0.134	5,154,893	0.00261	End of Line
14	Cat Reformer #1 Unit 123 Lift Station	Uncontrolled	100	0.0	0.728	0.000	0.00	0.000	5,154,893	0.00000	End of Line
12	Solvent Truck Rack Lift Station	Uncontrolled	100	0.0	0.728	0.000	0.00	0.000	5,154,893	0.00000	End of Line
20	South French Drain Lift Pump	Uncontrolled	100	0.0	0.728	0.000	0.00	0.000	4,908,649	0.00000	End of Line
21	North French Drain Lift Pump	Uncontrolled	99.7	0.3	0.728	0.006	0.00	0.006	2,253,264	0.00005	End of Line
16	Needle Coker Lift Pumps	Uncontrolled	99.0	1.0	0.728	0.012	0.00	0.012	5,154,893	0.00023	>0.05 Mg/yr
TK 003	Tank 3 Water	Uncontrolled	100	0.0	0.795	49.94	100	0.060	292,921	0.05537	End of Line
GRW-1, 2	Groundwater	Uncontrolled	100	0.0	0.000	0.000	0.00	0.000	18,556	0.00000	End of Line
GQ-MW-2A	Groundwater	Uncontrolled	100	0.0	0.000	0.000	0.00	0.000	91,945	0.00000	End of Line
	South Plant										
1	U212 + cleaning pad	Uncontrolled	100	0.0	0.728	0.062	0.00	0.062	4,072,336	0.00096	End of Line
2	U-112	Uncontrolled	100	0.0	0.728	0.043	0.00	0.043	4,072,336	0.00066	End of Line
3	U-217	Uncontrolled	100	0.0	0.728	0.107	0.00	0.107	4,072,336	0.00165	End of Line
4	U-111	Uncontrolled	100	0.0	0.728	0.023	0.00	0.023	4,072,336	0.00035	End of Line
5	U-111	Uncontrolled	97.0	3.0	0.728	2.780	96	2.813	4,072,336	0.07361	End of Line
6	U-13	Uncontrolled	100	0.0	0.728	0.116	0.00	0.116	4,072,336	0.00179	End of Line
7	U-15/25	Uncontrolled	100	0.0	0.728	0.079	0.00	0.079	4,072,336	0.00122	End of Line
8	U-14/16	Uncontrolled	100	0.0	0.728	0.010	0.00	0.010	4,072,336	0.00015	End of Line
9	Maintenance/cleaning pad	Uncontrolled	100	0.0	0.728	0.000	0.00	0.000	4,072,336	0.00000	End of Line
10	Laboratory	Uncontrolled	100	0.0	0.728	0.060	0.00	0.060	4,072,336	0.00092	End of Line
11	U102	Uncontrolled	100	0.0	0.728	0.000	0.00	0.000	4,072,336	0.00000	End of Line
46	U103/104	Uncontrolled	100	0.0	0.728	0.026	0.00	0.026	4,072,336	0.00040	End of Line
47	U590	Uncontrolled	100	0.0	0.728	0.007	0.00	0.007	4,072,336	0.00011	End of Line
38	Tank 433 Water to sewer	Uncontrolled	100	0.0	0.728	0.00	0.00	0.000	0	0.00000	>0.05 Mg/yr
43	Tank 434 Water to sewer	Uncontrolled	100	0.0	0.728	19.917	0.00	19.917	0	0.00000	End of Line
NA	Blend Center Pit	Uncontrolled	100	0.0	0.728	0.000	10,380	0.00	662,400	0.00000	End of Line
37	B&T Coker Road Lift Station	Uncontrolled	99.8	0.2	0.728	0.271	370	0.28	18,778,672	0.05749	End of Line

Total Annual Benzene
0.19759

Sample Number	Equipment Description	Controlled/ Uncontrolled	Percent Aqueous	Percent Organic	Hydrocarbon Specific Gravity	Benzene Concentration Aqueous (mg/L)	Benzene Concentration Organic (mg/kg)	Total Benzene in Waste (ppmw)	Volume (gal/qtr)	6.0 Mg Compliance Option	Type of Sample
	North Plant										
13	Udex Lift Station Unit -122	Uncontrolled	100	0.0	0.728	0.20	0.00	0.200	4,965,400	0.00376	End of Line
14	Cat Reformer #1 Unit 123 Lift Station	Uncontrolled	100	0.0	0.728	0.061	0.00	0.061	4,965,400	0.00115	End of Line
12	Solvent Truck Rack Lift Station	Uncontrolled	100	0.0	0.728	0.000	0.00	0.000	4,965,400	0.00000	End of Line
20	South French Drain Lift Pump	Uncontrolled	100	0.0	0.728	0.000	0.00	0.000	2,911,910	0.00000	End of Line
21	North French Drain Lift Pump	Uncontrolled	100	0.0	0.728	0.000	0.00	0.000	2,218,598	0.00000	End of Line
16	Needle Coker Lift Pumps	Uncontrolled	91.5	8.5	0.728	0.015	0.00	0.015	4,965,400	0.00026	>0.05 Mg/yr
TK 003	Tank 3 Water	Uncontrolled	100	0.0	0.795	10.48	100	0.060	1,445,067	0.05732	End of Line
GRW-1, 2	Groundwater	Uncontrolled	100	0.0	0.000	0.000	0.00	0.000	15,963	0.00000	End of Line
GQ-MW-2A	Groundwater	Uncontrolled	100	0.0	0.000	0.000	0.00	0.000	54,569	0.00000	End of Line
	South Plant										
1	U212 + cleaning pad	Uncontrolled	99	1.0	0.728	0.040	0.00	0.040	4,324,718	0.00065	End of Line
2	U-112	Uncontrolled	96	4.0	0.728	1.027	0.00	1.027	4,324,718	0.01614	End of Line
3	U-217	Uncontrolled	100	0.0	0.728	0.013	0.00	0.013	4,324,718	0.00021	End of Line
4	U-111	Uncontrolled	98.3	1.7	0.728	0.028	0.00	0.028	4,324,718	0.00045	End of Line
5	U-111	Uncontrolled	100	0.0	0.728	1.520	0.00	1.520	4,324,718	0.02488	End of Line
6	U-13	Uncontrolled	100	0.0	0.728	0.046	0.00	0.046	4,324,718	0.00075	End of Line
7	U-15/25	Uncontrolled	100	0.0	0.728	0.021	0.00	0.021	4,324,718	0.00034	End of Line
8	U-14/16	Uncontrolled	100	0.0	0.728	0.010	0.00	0.010	4,324,718	0.00016	End of Line
9	Maintenance/cleaning pad	Uncontrolled	100	0.0	0.728	0.000	0.00	0.000	4,324,718	0.00000	End of Line
10	Laboratory	Uncontrolled	100	0.0	0.728	0.142	0.00	0.142	4,324,718	0.00232	End of Line
11	U102	Uncontrolled	100	0.0	0.728	0.006	0.00	0.006	4,324,718	0.00010	End of Line
46	U103/104	Uncontrolled	100	0.0	0.728	3.010	0.00	3.010	4,324,718	0.04927	End of Line
47	U590	Uncontrolled	100	0.0	0.728	0.006	0.00	0.006	4,324,718	0.00010	End of Line
38	Tank 433 Water to sewer	Uncontrolled	100	0.0	0.728	0.00	0.00	0.000	0	0.00000	>0.05 Mg/yr
43	Tank 434 Water to sewer	Uncontrolled	100	0.0	0.728	7.700	0.00	7.700	0	0.00000	End of Line
NA	Blend Center Pit	Uncontrolled	100	0.0	0.728	0.000	10,380	0.00	529,920	0.00000	End of Line
37	B&T Coker Road Lift Station	Uncontrolled	93.9	6.1	0.728	0.340	9.29	0.35	6,881,091	0.01900	End of Line

Total Annual Benzene
0.17687

APPENDIX A

BWON Lab Audit Summary

Semi-Annual Report
July 1, 2011 – December 31, 2011

1.0 INTRODUCTION

1.1 PROJECT SUMMARY

CITGO Petroleum Corporation (CITGO) owns and operates several petroleum refineries located throughout the United States. In particular, CITGO operates a refinery in Lemont, Illinois. CITGO contract STAT Analysis Corporation (STAT or Laboratory), located at 2242 West Harrison Street, Chicago, IL 60612 to analyze environmental samples covered under the Resource Conservation and Recovery Act (RCRA) programs. Additionally, CITGO would like to utilize this laboratory to analyze samples pursuant to 40 CFR 61, Subpart FF – National Emissions Standards for Benzene Waste Operations NESHAP (referred to herein as BWON).

Trihydro Corporation (Trihydro) was contracted by CITGO to conduct a laboratory audit of STAT. This laboratory audit has been performed to meet laboratory audit obligations of the CITGO New Source Review Consent Decree (CD) entered into with the U.S. Environmental Protection Agency (EPA) and the State of Illinois that covers the Lemont Refinery. Under Paragraph 103 (c) of this CD, CITGO is required to conduct laboratory audits every two years and prior to use for any laboratories that perform analyses of BWON samples to ensure that proper analytical and quality assurance/quality control (QA/QC) standard procedures are met.

1.2 AUDIT PROCESS SUMMARY

Trihydro's audit procedures include submittal and review of a pre-audit questionnaire located in Appendix A, a review of the Laboratory's certifications located in Appendix B, a review of the Laboratory's Quality Assurance Manual (QAM) located in Appendix C, a review of the Laboratory's Standard Operating Procedures (SOPs) located in Appendix D, and an on-site visit. The completed pre-audit questionnaire was provided by STAT on July 1, 2011 and the on-site visit was conducted on July 7, 2011.

Frankie Wood-Black, Ph.D., REM, MBA of Trihydro arrived at STAT on July 7, 2011 to perform the on-site visit portion of the audit. Dr. Pinaki Banerjee, Quality Assurance Manager for STAT, facilitated the audit activities. The audit focused on sample acceptance, sample bottle storage, analytical methodology, internal QA/QC protocol, personnel qualifications, recordkeeping, health and safety practices, and sample disposal.

14.0 CONCLUSIONS

The audit of STAT revealed no findings that would prevent the Laboratory from analyzing CITGO BWON samples. The Laboratory appeared to be well organized, neat, clean and well designed to prevent potential cross-contamination. Individuals interviewed were knowledgeable and displayed a dedication to quality.

The Laboratory had addressed many of the items recommended during the previous on-site visit. One finding was noted during the on-site visit:

The documentation for the 2010 internal audit of the organics laboratory was not present.

As a result of this review, Trihydro recommends that:

A means of verifying the temperatures of the refrigerators and freezers during hours when personnel are not present in the laboratory.

The training files include documentation of any training related to equipment maintenance in addition to the training currently included.

The IR guns be calibrated on a quarterly basis.

1.0 INTRODUCTION

1.1 PROJECT SUMMARY

CITGO Petroleum Corporation (CITGO) owns and operates several petroleum refineries throughout the United States. These refineries are subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 61, Subpart FF– National Emission Standards for Benzene Waste Operations (referred to herein as "BWON"). In particular, CITGO operates a refinery in Lemont, Illinois (Refinery). CITGO has entered into a New Source Review Consent Decree (CD) with the United States (U.S.) Environmental Protection Agency (EPA) and the State of Illinois that covers this Refinery. Under Paragraph 103 (c) of this CD, CITGO is required to conduct laboratory audits, every two years, for any laboratories that perform analyses of BWON samples for the Refinery to ensure that proper analytical and quality assurance/quality control (QA/QC) standard procedures are met.

CITGO contracts with TestAmerica Laboratories, Inc. (TA or Laboratory), located at 2400 Cumberland Dr., Valparaiso, IN 46383, to analyze samples for benzene concentration pursuant to the BWON regulations. CITGO contracted Trihydro Corporation (Trihydro) to conduct the BWON laboratory audit of TA. This report documents the BWON audit performed at the Laboratory pursuant to the requirements of the CD.

1.2 AUDIT PROCESS SUMMARY

Trihydro's audit procedures include submittal and review of a pre-audit questionnaire located in Appendix A, a review of the Laboratory's certification located in Appendix B, a review of the Laboratory's Quality Assurance Manual (QAM) located in Appendix C, a review of the Laboratory's Standard Operating Procedures (SOPs) located in Appendix D, and an on-site visit. The completed pre-audit questionnaire was provided by TA on June 29, 2011, and the on-site visit was conducted on July 6, 2011.

Frankie Wood-Black, Ph.D., REM, MBA of Trihydro arrived at TA on July 6, 2011 to perform the on-site visit portion of the audit. Mr. Ken Busch, TA's Quality Assurance Manager, facilitated audit activities. The audit focused on sample acceptance, sample bottle storage, analytical methodology, internal QA/QC protocol, personnel qualifications, recordkeeping, health and safety, and sample disposal.

14.0 CONCLUSIONS AND RECOMMENDATIONS

The audit of TA revealed no findings that would prevent the Laboratory from analyzing CITGO BWON samples. The Laboratory appeared to be well organized, neat, clean, and well designed to prevent potential cross contamination.

Individuals interviewed were very knowledgeable in their particular areas. It was apparent that there had been little turnover in the areas, and each individual understood their roles and responsibilities. Records were readily accessible, appeared complete, and were promptly provided.

It was evident in the documentation and during the interviews that the Laboratory has a strong quality culture. Individuals are routinely reporting deviations and non-conformances. Monthly meetings have been held to review deviations, non-conformances, corrective actions, and customer complaints. Continuous improvement activities were evident in the development of checklists, utilization of the LIMS, and in the internal audit program.

Trihydro recommends the following based on this laboratory review:

- Any training related to maintenance of the equipment be included in the analytical chemist's training file.
- The maximum and minimum temperatures on the refrigerators and freezers be documented daily.

Lemont Refinery
CITGO Petroleum Corporation
Semi-Annual Report
July 1, 2011 – December 31, 2011

Attachment 8

LDAR Issues Summary

Attachment 8

CITGO Petroleum Corporation
Lemont Refinery
Semi-Annual report
July 1, 2011 - December 31, 2011

SUMMARY OF LDAR ISSUES IN 2ND HALF 2011 NSR CONSENT DECREE REPORT

Late initial repair attempt, late initial re-monitoring

Pumps (in light liqud service) and Valves (in light liquid and/or gas vapor service, and other than pressure relief devices) leaking at Internal Leak Threshold and with no intial repair attempt and/or re-monitoring within 5 days of initial detection

Compliance Group	Tag	Class	Date Reported	First Attempt Due Date	Initial Repair Date	Initial Retest Date	Issue	Note
No Pumps (in light liqud service) and Valves (in light liquid and/or gas vapor service, and other than pressure relief devices) leaking at Internal Leak Threshold had, within 5 days of initial detection, no intial repair attempt and/or re-monitoring.								

Pumps (in light liquid service) and Valves (in light liquid and/or gas-vapor service, and other than pressure relief devices) leaking above internal threshold not repaired within 30 days or placed on Delay of Repair List

Compliance Group	Tag	Class	Date Reported	Effective Repair Due Date	Actual Repair Date		Issue	Note
No Pumps (in light liquid service) and Valves (in light liquid and/or gas-vapor service, and other than pressure relief devices) leaking above internal threshold were, within 30 days of detection, not repaired or placed on Delay of Repair List or removed from service.								

Late placement on DOR (> 30 days after initial inspection) during reporting period.

Compliance Group	Tag	Class	Initial Inspection Date	DOR deadline	Date placed on Delay of Repair		Issue	Note
No pumps or valves were placed on Delay of Repair (DOR) more than 30 days after initial inspection during reporting period.								

Late Initial Repair Threshold Attempt (leakers w/ leak rate > 200 ppmv but < 500 ppmv, w/ no repair/remonitor w/in 5 days of initial inspection)

Compliance Group	Tag	Class	Initial Inspection Date	Repair/ Remonitor Deadline	Initial Repair Attempt Date	Initial Remonitor Date	Issue	Note
There were no Initial Repair Threshold Attempts (leakers w/ leak rate > 200 ppmv but < 500 ppmv) that were more than 5 days after the initial inspection.								

3rd Party LDAR Audit Issues

An audit was started on June 6th but not completed until July 21st due to unit accessability. The audit report findings included 10 items of varying priority. Most items were corrected prior to the conclusion of the field audit, and all items were corrected during the 3rd quarter.

Lemont Refinery
CITGO Petroleum Corporation
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July 1, 2011 – December 31, 2011

Attachment 9

LDAR

Lemont Refinery
CITGO Petroleum Corporation
Semi-Annual Report
July 1, 2011 to December 31, 2011

ATTACHMENT 9

LDAR Summary

List of process units monitored during the reporting period [130(b)(i)]
The information is contained in the Refinery MACT/HON semi-annual report submitted to IEPA.

Number of valves and pumps present in each process unit [130(b)(ii)]
The information is contained in the Refinery MACT/HON semi-annual report submitted to IEPA.

Number of valves and pumps monitored in each process unit [130(b)(iii)]
The information is contained in the Refinery MACT/HON semi-annual report submitted to IEPA.

Number of valves and pumps found leaking [130(b)(iv)]
The information is contained in the Refinery MACT/HON semi-annual report submitted to IEPA.

Number of "Difficult to Monitor" pieces of equipment monitored [130(b)(v)]
See **Appendix A** (DTM Inspections)

Projected month and year of the next monitoring event for each unit [130(b)(vi)]
See **Appendix B** (Monitoring Schedule)

Current Delay of Repair items [130(b)(vii)]
The reporting requirements for this section relate to the injection requirements for components otherwise placed on "Delay of Repair" status described in paragraph 128.

The requirement to inject components became applicable on February 28, 2006.

See **Appendix C** (Delay of Repair information)

Initial Repair Attempt information [130(b)(viii)]
The reporting requirements for this section relate to the Initial Repair Attempt Leak Threshold described in paragraph 122.

The Initial Repair Attempt Threshold of 200 ppmv became applicable on September 30, 2005.

See **Appendix D** (Initial Repair Attempt) and related monthly details.

Internal Leak Threshold issues [130(b)(ix)]
The reporting requirements for this section relate to the Internal Leak Thresholds described in paragraphs 119 and 120b.

The Internal Leak Definition for Valves of 500 ppmv became applicable on February 28, 2006.

The Internal Leak Definition for Pumps of 2000 ppmv became applicable on February 28, 2006.

See **Appendix E** (Internal Leak Definition information)

Audit Finding Summary [118]
3rd party audit began during this reporting period but was not completed until July 21st 2011.

See **Appendix F** (Audit Finding Summary)

ATTACHMENT 9, Appendix A
Difficult-to-Monitor Equipment
[130(b)(v)]

Lemont Refinery
CITGO Petroleum Corporation
Semi-Annual Report
July 1, 2011 to December 31, 2011

Unit	Description	No. of LL/GV DTM pieces of equipment monitored during reporting period	Note
102	FCC Gasoline Hydrotreater	13	Bulk of DTM monitoring conduct March through May
103	Gasoline hydrotreater		
106	Coker 2 - vacuum		
107	Coker 2 - hydrotreater	15	
108	Coker 2 - coker		
109	Coker 2 - H2 unit		
111	Crude	17	
112	FCC	2	
113	Sponge coker	12	
114	Naphtha hydrotreater		
115	Lt. Distillate Hydrotreater		
116	CRU No. 2		
118	Unisar	2	
119	SRU -119	2	
120	Alky		
121	SRU - 121		
122	UDEX		
123	CRU No. 1	25	
125	Diesel hydrotreater		
153	Inter-unit pipe-way		
212	Unsat gas plant	4	
217	Sat gas plant		
228	Blend Center		
331	Tank Farm	60	
333	Canal Dock		
334	Santa Fe Car Rack		
335	Fuels Rack		
337	IC Tank Car Rack		
338	Solvents Truck Rack		
430	Water Treaters		
590	ULSD	6	
844	Waste water treatment/flares		
Total		158	

ATTACHMENT 9, Appendix B
LDAR Monitoring Schedule [130(b)(vi)]

Lemont Refinery
CITGO Petroleum Corporation
Semi-Annual Report
July 1, 2011 to December 31, 2011

Unit	Description	Month-of-the-Quarter LDAR Monitoring Schedule											
		1st quarter			2nd quarter			3rd quarter			4th quarter		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
102	Gasoline hydrotreater			●			●			●			●
103	LSR HydrotreaterGasoline hydrotreater			●			●			●			●
106	Coker 2-vacuum			●			●			●			●
107	Coker 2 - hydrotreater			●			●			●			●
108	Coker 2 - coker			●			●			●			●
109	Coker2 - H2 (PSA)			●			●			●			●
111	Crude		●			●			●			●	
112	FCC			●			●			●			●
113	Sponge coker			●			●			●			●
114	Naphtha hydrotreater			●			●			●			●
115	Lt. Distillate Hydrotreater		●			●			●			●	
116	CRU No. 2			●			●			●			●
118	Unisar		●			●			●			●	
119	SRU -119		●			●			●			●	
120	Alky			●			●			●			●
121	SRU - 121		●			●			●			●	
122	UDEX	●			●			●			●		
123	CRU No. 1		●			●			●			●	
125	Diesel hydrotreater		●			●			●			●	
153	Inter-unit pipe-way		●			●			●			●	
212	Unsat gas plant			●			●			●			●
217	Sat gas plant	●			●			●			●		
228	Blend Center		●			●			●			●	
331	Tank Farm	●			●			●			●		
333	Canal Dock	●			●			●			●		
334	Santa Fe Car Rack		●			●			●			●	
335	Fuels Rack		●			●			●			●	
337	IC Tank Car Rack	●			●			●			●		
338	Solvents Truck Rack	●			●			●			●		
430	Water Treaters		●			●			●			●	
590	Ultra Low Sulfur Diesel Hydrotreater	●			●			●			●		
844	Waste water treatment/flares		●			●			●			●	
All units: LL pumps		●	●	●	●	●	●	●	●	●	●	●	●

The above schedule reflects the general period when the bulk of a unit's valves are to be monitored. Some components in units may not fall within the unit's general monthly schedule for a variety of reasons, including (but not limited to): being on follow-up re-monitor schedule, recently added and thus on a different schedule based on when they were added, on an annual monitoring frequency due to being "Difficult to Monitor", or shifted to or from a monthly monitoring schedule depending on HON leak rate. TBD ("To Be Determined") reflects the uncertainty regarding whether HON components will be on monthly or quarterly monitoring, depending on prior monitoirng results.

enu ' rer ...eriod), placed there since February 28, 2006.

Nu. er	.pe	Description	Initial Inspection Date	Concentration (ppmv)	Date leaking > 10,000 ppmv	For valves leaking > 10,000 ppmv				Date placed on Delay of Repair	Placed on Delay of Repair by Unit Supervisor w/in 30 days?	Is LDAR monitoring conitinuing while on Delay of Repair	For pumps, were best efforts used to isolate and repair?
						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
PSL .02'	VALVE	CONTROL VALVE 102FV-618, W of PUMP 102G-8A	09/17/2007	9,286	10/01/2007	Steam packing	3,966	09/17/2007	TIMELY	10/01/2007	TIMELY	Yes	NA
						Tighten packing	3,966	09/20/2007	TIMELY				
						Tighten packing	28,300	10/01/2007	TIMELY				
						Control valve - cannot inject							
0102NSPSGV00267	VALVE	102D-21 W SIDE OF TOWER 6TH LANDI	04/08/2010	9649	04/13/2010	Tighten	17500	04/13/2010	TIMELY	04/23/2010	TIMELY	Yes	NA
						Tighten Packing	45700	4/22/2010					
						Control Valve - injection not appropriate							
0102NSPSLL00182	VALVE	102F-1 E SIDE OF VESSEL CONTROL VALVE 102FV-109	07/25/2011	1,071	NA	Steamed	5792	07/25/11	NA	08/09/2011	TIMELY	Yes	NA
0102NSPSLL00186	VALVE	CONTROL VALVE 102FV-110 ON N SIDE	5/10/2011	2621	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	5/16/2011	TIMELY	Yes	NA
0102NSPSLL00482	VALVE	AT PUMP 102G-22B OH CHK	06/06/2008	1,004	06/18/2008	Tighten flange	672	06/06/2008	TIMELY	06/21/2008	TIMELY	Yes	NA
						Previous repair	531	06/10/2008	TIMELY				
						Tighten flange	1,205	06/12/2008	TIMELY				
						Applied sealant	557	06/14/2008	TIMELY				
						Previous repair	53,000	06/18/2008	TIMELY				
						Replaced	8,578	06/21/2008	TIMELY				
						Leak source was flange -- not injectable.							
0102NSPSLL00797	VALVE	S OF PUMP 102G-2a IN PIPE ROW 15 FT OH LPB	06/06/2008	978	06/12/2008	Steam fitting	5,398	06/06/2008	TIMELY	06/21/2008	TIMELY	Yes	NA
						Tighten fitting	1,082	06/10/2008	TIMELY				
						Tighten fitting	51,900	06/12/2008	TIMELY				
						Applied sealant	1,335	06/14/2008	TIMELY				
						Previous repair	629	06/18/2008	TIMELY				
						Applied sealant	1,707	06/20/2008	TIMELY				
						Previous repair	1,599	06/21/2008	TIMELY				
						Leak source was screwed fitting on valve, not injectable							
0102NSPSLL00862	VALVE	S AT 102E-9	04/01/2009	10,900	04/01/2009	Tighten bonnet	19800	04/01/2009	TIMELY	04/15/2009	TIMELY	Yes	NA
						Tighten	2828	04/03/2009	TIMELY				
						Previous repair	4896	04/06/2009	TIMELY				
						Tighten	5139	04/07/2009	TIMELY				
						Inject	28200	04/09/2009	TIMELY				
						Previous repair	1301	04/14/2009	TIMELY				
						Applied sealant	25900	04/15/2009	TIMELY				
AVO-0090	CONECT	BOTTOM FLANGE OF 102E-13	09/15/2008	100,000	09/15/2008	Not a valve	Not a valve	Not a valve	Not a Valve	09/18/2008	TIMELY	Yes	NA
0103NSPSGV00085	VALVE	CTV TV-87 E SIDE OF E-1C	06/20/2008	4,625	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/27/2008	TIMELY	Yes	NA
0103NSPSGV00437	VALVE	SW SIDE OF F-6 OH	03/04/2008	10,800	03/04/2008	Tighten plug	18,800	03/04/2008	TIMELY	03/18/2008	TIMELY	Yes	NA
						Previous repair	36,800	03/05/2008	TIMELY				
						Tighten plug	25,800	03/06/2008	TIMELY				
						Previous repair	34,700	03/15/2008	TIMELY				
						Leak source wa a plug, not injectable							
0103NSPSLL00131	VALVE	ON CTL HV-947 W SIDE OF D-46 1ST LVL	05/26/2008	938	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/08/2006	TIMELY	Yes	NA

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						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0103NSPSLL00311	VALVE	NE SIDE OF G-4A	03/03/2008	67,200	03/03/2008	Tighten packing	9,588	03/03/2008	TIMELY	03/18/2008	TIMELY	Yes	NA
						Tighten packing	23,900	03/06/2008	TIMELY				
						Previous repair	222,400	03/15/2008	TIMELY				
						Previous repair	6,104	03/17/2008	TIMELY				
						Inject	2,193	03/18/2008	TIMELY				
						Re-inject	1,099	03/18/2008	TIMELY				
0103NSPSLL00446	VALVE	W BATTERY LIITS UNDER CATWALSK CHK	06/24/2008	4,261	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	07/09/2008	TIMELY	Yes	NA
0111NSPSGV00428	RELIEF	PRV ON TOP OF F-2	11/07/2006	2,216	11/09/2006	Tighten bonnet	13,100	11/09/2007	NA	11/16/2006	TIMELY	Yes	NA
						Previous repair	2,250	11/13/2007	NA				
						Tighten packing	3,813	11/14/2007	NA				
						Previous repair	1,485	11/15/2007	NA				
						Relief Valve - injection not appropriate							
0111NSPSGV00920	VALVE	CONTROL VALVE 11PV-311. F-2 LINE TO FURNACE AT E SIDE OF F-6 ABOVE E-SIDE OF FURNACES	07/11/2007	127,000	07/11/2007	Steam packing	100,000	07/13/2007	NA	07/31/2007	TIMELY	Yes	NA
						Previous repair	120,100	07/26/2007	NA				
						Previous repair	100,000	07/30/2007	NA				
						Control valve - can not inject							
15253 (formerly tag no. 0111NSPSLL00315)	VALVE	ON STRUCT TOP OF EXCH DECK AT 11E-1A TOP	08/31/2006	875	09/08/2006	Tighten packing	24,400	09/08/2007	TIMELY	09/15/2006	TIMELY	Yes	NA
						Tighten packing	2,071	09/08/2007	TIMELY				
						Tighten packing	1,684	09/14/2007	TIMELY				
						Tighten packing	2,000	09/15/2007	TIMELY				
0112NSPSGV00240	VALVE	TOP OF112G-1A, 2ND LANDING, E SIDE OF BATTERY LIMITS	12/20/2007	2,411	12/20/2007	Steam seal	100,000	12/21/2007	TIMELY	01/04/2007	TIMELY	Yes	NA
						Tighten packing	1,394	01/02/2007	TIMELY				
0112NSPSLL00348	VALVE	OVER G-1A BATTERY LIMITS 1ST LANDING AT E SIDE BATTERY LIMITS OVER RAIL	07/13/2009	7,378	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	07/28/2009	TIMELY	Yes	NA
0114NSPSGV00179	VALVE	W SIDE OF FURNACE B-1, 10 FT OH	06/06/2007	720	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/19/2007	TIMELY	Yes	NA
0114NSPSGV00190	VALVE	S SIDE OF D-1 REACTOR	08/01/2006	686	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/15/2006	TIMELY	Yes	NA
0114NSPSGV00191	VALVE	BOTTOM OF 14-D1 REACTOR	12/06/2006	596	12/15/2006	Tighten	1,624	12/06/2006	TIMELY	12/21/2006	TIMELY	Yes	NA
						Tighten plug	2,312	12/08/2006	TIMELY				
						Sealant	100,000	12/15/2006	TIMELY				
						Sealant	1,579	12/18/2006	TIMELY				
						Previous repair	17,900	12/20/2006	TIMELY				
						Previous repair	16,700	12/21/2006	TIMELY				
0114NSPSGV00203	VALVE	TOP OF D-3 TOWER	09/28/2007	834	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/12/2007	TIMELY	Yes	NA
0114NSPSGV00216	VALVE	114F-3 E SIDE OF VESSEL AT CONTROL LOOP 114PV-374A	05/08/2010	1,364	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	05/19/2010	TIMELY	Yes	NA
0114NSPSGV00392	COMPR	COMPRESSOR 114GB-1 SW OF STAELLITE	04/29/2009	13,000	04/29/2009	Not a Valve	Not a Valve	Not a Valve	Not a Valve	05/15/2009	TIMELY	Yes	NA

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						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0114NSPSLL00036	VALVE	AT CTL FV-150 10FT HIGH W SIDE OF 16B-2 FURNACE	09/14/2006	16,000	09/14/2006	Tighten packing	22,700	09/14/2006	TIMELY	09/27/2006	TIMELY	Yes	NA
						Tighten packing	674	09/21/2006	TIMELY				
						Tighten packing	1,211	09/25/2006	TIMELY				
0114NSPSLL00043	VALVE	CTV TV-531 SE SIDE OF E-5A EXCHANGER	06/05/2009	3,603	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/19/2009	TIMELY	Yes	NA
0114NSPSLL00046	VALVE	SE SIDE OF E-5A LPB	06/04/2007	1,213	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/19/2007	TIMELY	Yes	NA
0114NSPSLL00187	VALVE	AT CTL 14LV-725, SE SIDE OF F-3	10/15/2008	2,549	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/23/2007	TIMELY	Yes	NA
0114NSPSLL00188	VALVE	SE SIDE OF 14F-3 AT CTL 14LV-725	09/21/2008	1,483	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/05/2007	TIMELY	Yes	NA
0114NSPSLL00308	VALVE	12 FT HIGH 12 FT N SIDE OF G-8 PUMP	06/13/2008	1,220	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/23/2008	TIMELY	Yes	NA
0114NSPSLL00332	VALVE	E SIDE OF PMP 14G-8 LPB	09/22/2007	1,151	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/05/2007	TIMELY	Yes	NA
0114NSPSLL00334	VALVE	E SIDE OF PUMP 114G-8	06/09/2008	802	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/18/2008	TIMELY	Yes	NA
0114NSPSLL00367	VALVE	25 FT HIGH 6 FT NW SIDE OF G-6 PUMP	05/02/2007	722	05/04/2007	Apply sealant	14,400	05/04/2007	TIMELY	05/23/2007	TIMELY	Yes	NA
						Previous repair	1,873	05/17/2007	TIMELY				
0114NSPSLL00434	RELIEF	SV-4002 UNDER N FFs	09/10/2008	1,600	NA	Not a Valve	Not a Valve	Not a Valve	Not a Valve	09/25/2008	TIMELY	Yes	NA
0114NSPSLL00604	VALVE	10 ft NORTH OF 114-F4 1st LANDING ORIFICE TAP AT 14FT-115	09/09/2008	32,700	09/09/2008	Steam packing	31800	09/09/2008	TIMELY	09/25/2008	TIMELY	Yes	NA
						Tighten packing	3875	09/11/2008	TIMELY				
						Tighten packing	1736	09/17/2008	TIMELY				
						Previous repair	2684	09/22/2008	TIMELY				
						Previous repair	9067	09/25/2008	TIMELY				
0114NSPSLL00608	VALVE	10 FT NORTH OF 116F-2 1ST LANDING ORIFICE TAP AT 114FT-157	06/13/2008	6,109	06/13/2008	Tighten packing	14,000	06/13/2008	TIMELY	06/23/2008	TIMELY	Yes	NA
						Tighten packing	2,431	06/18/2008	TIMELY				
						Apply sealant	603	06/20/2008	TIMELY				
0115NSPSGV00015	BALL VALV	115GB-7 E SIDE OF COMPRESSOR	11/16/2011	6,900	NA	Steam Packing	5,760	11/16/2011	NA	11/22/2011	TIMELY	Yes	NA
						This is a damaged ball valve - no injection							
0115NSPSLL00006	VALVE	W SIDE OF F-9	02/05/2009	1,042	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	02/20/2009	TIMELY	Yes	NA
0116NSPSGV00012	VALVE	EAST SIDE OF COMPRESSOR 116GB-1 ON LANDING AT PRESSURE INDICATOR	07/11/2008	6,029	07/15/2008	Tighten packing	8368	07/11/2008	TIMELY	07/28/2008	TIMELY	Yes	NA
						Tighten packing	20600	07/15/2008	TIMELY				
						Apply sealant	6992	07/17/2008	TIMELY				
						Needle valve - can not inject							
0116NSPSGV00073	VALVE	UNDERNEATH REACTOR 16-D2	12/07/2006	13,333	12/07/2006	Tighten packing	787	12/13/2006	TIMELY	12/21/2006	TIMELY	Yes	NA
						Previous repair	2,199	12/15/2006	TIMELY				
						Sealant	665	12/18/2006	TIMELY				
						Previous repair	6,944	12/20/2006	TIMELY				
						Previous repair	921	12/21/2006	TIMELY				
0116NSPSGV00079	VALVE	UNDER RECTOR 16-D1	03/18/2008	869	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	03/27/2008	TIMELY	Yes	NA
0116NSPSGV00094	VALVE	N OF SOUTH FIN FAN 16E-7 OH 15 FT	06/09/2009	2,675	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/24/2009	TIMELY	Yes	NA

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						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0116NSPSGV00148	VALVE	SW SIDE OF SEPARATOR 14F-1 25 FT UP BY COLUMN PS32	06/19/2008	8,853	06/24/2008	Steam packing	4,535	06/19/2008	TIMELY	07/03/2008	TIMELY	Yes	NA
						Tighten packing	12,900	06/24/2008	TIMELY				
						Previous repair	20,200	07/02/2008	TIMELY				
						Tighten packing	1,552	07/03/2008	TIMELY				
						Inject	59,000	07/03/2008	TIMELY				
0116NSPSGV00210	VALVE	S SIDE OF FIN FANS 16E-6A TOP LANDING	09/12/2006	3,501	09/25/2006	steam seal	1,939	09/12/2006	TIMELY	09/27/2006	TIMELY	Yes	NA
						Inject	1,480	09/21/2006	TIMELY				
						Tighten packing	3,100	09/22/2006	TIMELY				
						Steamed and tightened packing	10,400	09/25/2006	TIMELY				
						Previious repair	2,355	09/27/2006	TIMELY				
						Previoius repair	1,272	09/27/2006	TIMELY				
0116NSPSGV00223	VALVE	OH COMPRESSOR, 14F-9B AT TOP LANDING	10/24/2007	15,100	10/24/2007	Tighten packing	27,000	10/24/2007	TIMELY	11/20/2007	TIMELY	Yes	NA
						Tighten packing	563	10/30/2007	TIMELY				
						Tighten packing	2,422	11/01/2007	TIMELY				
						Tighten packing	1,249	11/01/2007	TIMELY				
						Tighten packing	1,042	11/02/2007	TIMELY				
						Re-injection	3,008	11/05/2007	TIMELY				
						Re-injection	1,066	11/07/2007	TIMELY				
						close valve	1,219	11/09/2007	TIMELY				
0116NSPSGV00233	VALVE	OH COMPRESSOR 116GV-1 OFF 1ST LANDING	06/20/2008	2,712	06/24/2008	Tighten packing	2,643	06/20/2008	TIMELY	07/03/2008	TIMELY	Yes	NA
						Tighten packing	32,800	06/24/2008	TIMELY				
						Tighten packing	14,000	06/26/2008	TIMELY				
						Previous repair	9,095	07/02/2008	TIMELY				
						Previous repair	2,044	07/03/2008	TIMELY				
0116NSPSGV00269	VALVE	LANDING ABOVE AND E OF COMPRESSOR 16GB-1	06/03/2006	3,303	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/19/2006	TIMELY	Yes	NA
0116NSPSGV00318	VALVE	TOP OF D-4 TOWER HPB	09/21/2007	18,900	09/21/2007	Tighten flange	13,900	09/21/2007	TIMELY	10/05/2007	TIMELY	Yes	NA
						Tighten flange	12,600	09/26/2007	TIMELY				
						Tighten flange	1,105	09/28/2007	TIMELY				
						Tighten flange	804	10/01/2007	TIMELY				
						Tighten flange	3,144	10/02/2007	TIMELY				
						Leak source was upstream flange. Not injectable.							
0116NSPSGV00354	VALVE	TOP S SIDE OF F-2 DRUM 1ST LANDING INST PT-371	09/12/2006	4,819	09/18/2006	Tighten packing	20,000	09/18/2006	TIMELY	09/27/2006	TIMELY	Yes	NA
						Tighten packing	12,800	09/18/2006	TIMELY				
						Tighten packing	19,200	09/21/2006	TIMELY				
						Previous repair	51,700	09/25/2006	TIMELY				
						Previous repair	22,400	09/27/2006	TIMELY				
						Needle valve - can not inject							

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						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0116NSPSGV00362	VALVE	TO S SIDE OF E-4 EXCHANGER, 2ND LANDING	09/22/2007	2,345	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/05/2007	TIMELY	Yes	NA
0116NSPSGV00502	VALVE	E SIDE OF TOWER 16F-1 AT 16FT-104	09/26/2007	4,765	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/05/2007	TIMELY	Yes	NA
0116NSPSGV00554	VALVE	AT COMPRESSOR 116GV-1 E SIDE LANDING	03/18/2008	8,371	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	03/27/2008	TIMELY	Yes	NA
0116NSPSGV00622	VALVE	W SIDE OF TOWER 16F-1 15 FT UP AT SG	03/28/2008	5,173	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	04/14/2008	TIMELY	Yes	NA
0116NSPSGV00713	VALVE	155 FT HIGH 10 FT NW SIDE OF G-6 PUMP	09/17/2009	4,456	09/28/2009	Tighten packing	5,957	09/17/2009	TIMELY	09/29/2009	TIMELY	Yes	NA
						Tighten packing	2,072	09/21/2009	TIMELY				
						Tighten packing	2,503	02/22/2009	TIMELY				
						Applied sealant	1,858	09/25/2009	TIMELY				
						Applied sealant	593	09/25/2009	TIMELY				
						Applied sealant	588	09/28/2009	TIMELY				
						Steam	25,900	09/28/2009	TIMELY				
						Previous repair	1,473	10/05/2009	TIMELY				
0116NSPSGV00753	VALVE	E SIDE OF TOWER 16D-4 1ST LANDING AT SG	06/05/2006	14,194	06/14/2006	Tighten packing	2,530	06/05/2006	TIMELY	07/05/2006	TIMELY	Yes	NA
						Previous repair	2,679	06/06/2006	TIMELY				
						Previous repair	671	06/07/2006	TIMELY				
						Previous repair	1,232	06/08/2006	TIMELY				
						Previous repair	1,077	06/09/2006	TIMELY				
						Previous repair	1,129	06/12/2006	TIMELY				
						Previous repair	1,088	06/13/2006	TIMELY				
						Previous repair	16,300	06/14/2006	TIMELY				
						Tighten packing	2,094	06/15/2006	TIMELY				
						Previous repair	726	06/16/2006	TIMELY				
						Previous repair	19,200	06/19/2006	TIMELY				
						Re-inject	15,500	06/20/2006	TIMELY				
						Re-inject	13,900	06/20/2006	TIMELY				
						Previous repair	795	06/21/2006	TIMELY				
						Previous repair	1,154	06/22/2006	TIMELY				
						Previous repair	941	06/23/2006	TIMELY				
						Previous repair	1,061	06/26/2006	TIMELY				
						Previous repair	21,400	06/29/2006	TIMELY				
						Previous repair	16,700	06/30/2006	TIMELY				
						Previous repair	3,072	07/03/2006	TIMELY				
						Previous repair	910	07/05/2006	TIMELY				
						Previous repair	811	07/06/2006	TIMELY				
0116NSPSLL00013	VALVE	AT CTL 16FV-130 W SIDE OF FEED HEATER 116B-1	10/12/2006	2,015	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/25/2006	TIMELY	Yes	NA

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Component Number	Type	Description	Initial Inspection Date	Concentration (ppmv)	Date leaking > 10,000 ppmv	For valves leaking > 10,000 ppmv				Date placed on Delay of Repair	Placed on Delay of Repair by Unit Supervisor w/in 30 days?	Is LDAR monitoring conitinuing while on Delay of Repair	For pumps, were best efforts used to isolate and repair?
						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0116NSPSLL00014	VALVE	AT CTL 16FV-130 W SIDE OF FEED HEATER 116B-1	10/12/2006	1,122	10/23/2006	Tighten packing	2,205	10/12/2006	TIMELY	10/27/2006	TIMELY	Yes	NA
						Previous repair	2,416	10/16/2006	TIMELY				
						Previous repair	506	10/18/2006	TIMELY				
						Inject	3,390	10/19/2006	TIMELY				
						Previous repair	646	10/20/2006	TIMELY				
						Previous repair	11,353	10/23/2006	TIMELY				
						Previous repair	3,722	10/24/2006	TIMELY				
						Steam seal	1,612	10/25/2006	TIMELY				
						Previous repair	9,987	10/26/2006	TIMELY				
						Previous repair	4,311	10/27/2006	TIMELY				
0116NSPSLL00018	VALVE	AT CTL FV-130 W OF 116B-1 OH ORIFICE TAP	12/07/2006	13,800	12/07/2006	Steam seal	10,800	12/07/2006	TIMELY	12/21/2006	TIMELY	Yes	NA
						Tighten packing	3,189	12/15/2006	TIMELY				
						Steam packing	667	12/18/2006	TIMELY				
						Sealant	6,869	12/19/2006	TIMELY				
						Previous repair	2,944	12/20/2006	TIMELY				
						Previous repair	3,241	12/21/2006	TIMELY				
0116NSPSLL00113	VALVE	AT CTL FV-132 10FT HIGH W SIDE OF B-4 FURNACE	12/07/2006	23,400	12/07/2006	Steam seal	21,000	12/07/2006	TIMELY	12/21/2006	TIMELY	Yes	NA
						Tighten packing	525	12/15/2006	TIMELY				
						Steam packing	629	12/18/2006	TIMELY				
						Sealant	568	12/19/2006	TIMELY				
						Previous repair	1,295	12/20/2006	TIMELY				
						Previous repair	7,652	12/21/2006	TIMELY				
0116NSPSLL00140	VALVE	W SIDE OF E-3 1ST LANDING	11/20/2006	657	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	12/05/2006	TIMELY	Yes	NA
0116NSPSLL00144	VALVE	PUMP 16G-3B	07/11/2008	4,786	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	07/28/2008	TIMELY	Yes	NA
0116NSPSLL00169	VALVE	AT PUMP 16G-3A	12/05/2006	1,137	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	12/20/2006	TIMELY	Yes	NA
0116NSPSLL00170	VALVE	E SIDE OF D-4 TOWER 1ST LANDING	12/06/2006	888	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	12/21/2006	TIMELY	Yes	NA
0116NSPSLL00172	VALVE	E SIDE OF D-4 TOWER 1ST LANDING	12/06/2006	574	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	12/21/2006	TIMELY	Yes	NA
0116NSPSLL00262	VALVE	G-2A PUMP SPB	12/11/2007	657	12/13/2007	Steam plug	2,247	12/11/2007	TIMELY	01/10/2008	TIMELY	Yes	NA
						Replace plug	10,329	12/13/2007	TIMELY				
						Tighten packing	3,825	12/17/2007	TIMELY				
						Previous repair	3,844	12/18/2007	TIMELY				
						Tighten packing	2,667	12/19/2007	TIMELY				
						Previous repair	6,383	12/20/2007	TIMELY				
						Inject	3,305	12/21/2007	TIMELY				
						Previous repair	3,604	12/26/2007	TIMELY				
						Previous repair	3,451	12/27/2007	TIMELY				
						Previous repair	6,643	12/28/2007	TIMELY				
						Previous repair	4,763	01/03/2008	TIMELY				
						Previous repair	1,769	01/10/2008	TIMELY				
						Re-inject	2,798	01/10/2008	TIMELY				

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						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0116NSPSLL00270	VALVE	G-2B PUMP SPB	09/14/2006	1,463	09/27/2006	Tighten plug	2,147	09/14/2006	TIMELY	09/27/2006	TIMELY	Yes	NA
						Tighten packing	1,691	09/21/2006	TIMELY				
						Previous repair	4,502	09/25/2006	TIMELY				
						Previous repair	42,100	09/27/2006	TIMELY	09/27/2006	TIMELY	Yes	
						Leak source was the plug and could not be injected							
0118NSPSGV00076	VALVE	PLATFORM N OF FIN FAN 118E-4 OVER RAIL	08/15/2007	665	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/30/2007	TIMELY	Yes	NA
0118NSPSGV00218	VALVE	AT 118D-5 1ST LANDING OUTSIDE LADDER SW SIDE AT SG	08/17/2007	1,131	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/31/2007	TIMELY	Yes	NA
0118NSPSLL00005	VALVE	N SIDE OF REACTOR 118D-51C ON BOTTOM W SIDE	11/14/2007	929	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	11/29/2007	TIMELY	Yes	NA
0118NSPSLL00006	VALVE	N SIDE OF REACTOR 118D-51C ON BOTTOM W SIDE	10/17/2006	794	10/19/2006	Steam seal	5,692	10/17/2006	TIMELY	11/01/2006	TIMELY	Yes	NA
						Previous repair	11,600	10/19/2006	TIMELY				
						Previous repair	13,100	10/20/2006	TIMELY				
						Previous repair	11,981	10/23/2006	TIMELY				
						Previous repair	8,642	10/24/2006	TIMELY				
						Previous repair	2,106	10/25/2006	TIMELY				
						Previous repair	7,179	10/26/2006	TIMELY				
						Previous repair	2,148	10/27/2006	TIMELY				
						Previous repair	590	10/30/2006	TIMELY				
						Previous repair	708	10/31/2006	TIMELY				
						Previous repair	538	11/01/2006	TIMELY				
						Tighten fitting	738	11/01/2006	TIMELY				
0118NSPSLL00041	VALVE	S OF PUMP 118G-2 UNDER W BATT LIMITS IN INST BOX FT-105	08/17/2007	1,020	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/31/2007	TIMELY	Yes	NA
0118NSPSLL00071	VALVE	ON CTL 118FV-103 S OF TOWER 118D-1	01/17/2007	5,194	01/17/2007	Steam seal (upstream flange)	21,200	01/17/2007	TIMELY	01/31/2007	TIMELY	Yes	NA
						Previous repair	4,120	01/19/2007	TIMELY				
						Apply sealant	851	01/23/2007	TIMELY				
						Apply sealant	1,053	01/26/2007	TIMELY				
						Previous repair	637	01/31/2007	TIMELY				
0118NSPSLL00122	VALVE	E OF PUMP 18G-58B N OF FIN FAN EF-53A	11/13/2007	775	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	11/29/2007	TIMELY	Yes	NA
0118NSPSLL00124	VALVE	E OF PUMP 18G-58B N OF FIN FAN EF-53A	11/13/2007	804	11/13/2007	Steamed flange	23,100	11/13/2007	TIMELY	11/29/2007	TIMELY	Yes	NA
						Previous repair	688	11/27/2007	TIMELY				
						Previous repair	3,279	11/28/2007	TIMELY				
						Previous repair	3,018	11/29/2007	TIMELY				
						Leak source was valve flange - not injectable.							
0118NSPSLL00332	VALVE	UNDER 18F-51	11/14/2007	638	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	11/30/2007	TIMELY	Yes	NA
0118NSPSLL00406	VALVE	S SIDE OF PUMP 18G-10	02/08/2008	803	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	02/20/2008	TIMELY	Yes	NA
0118NSPSLL00458	VALVE	S SIDE OF PUMP 118G-12B	05/11/2007	524	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	05/25/2007	TIMELY	Yes	NA

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						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0118NSPSLL00488	VALVE	W BATT LIMITS BELOW PLAT NE SIDE ABOVE PUMP 118G-20	05/16/2008	1,172	05/20/2008	Steam packing	1,657	05/16/2008	TIMELY	05/30/2008	TIMELY	Yes	NA
						Tighten packing	26,300	05/20/2008	TIMELY				
						Tighten packing	14,900	05/22/2008	TIMELY				
						Inject	2,517	05/27/2008	TIMELY				
						Inject	8,372	05/28/2008	TIMELY				
01158NSPSLL00489	VALVE	W BATT LIMITS BELOW PLAT NE SIDE ABOVE PUMP 118G-20	05/16/2008	2,431	05/20/2008	Steam packing	3,108	05/16/2008	TIMELY	05/30/2008	TIMELY	Yes	NA
						Tighten packing	29,700	05/20/2008	TIMELY				
						Tighten packing	20,400	05/22/2008	TIMELY				
						Inject	1,908	05/27/2008	TIMELY				
						Inject	564	05/28/2008	TIMELY				
						Previous repair	2,931	05/30/2008	TIMELY				
0118NSPSLL00497	VALVE	S OF TOWER 118D-1 OH L SIDE OF INST BOX 118D-1	05/16/2007	935	05/21/2007	Tighten packing	6,003	05/16/2007	TIMELY	05/31/2007	TIMELY	Yes	NA
						Tighten packing	13,000	05/21/2007	TIMELY				
						Tighten packing	1,189	05/24/2007	TIMELY				
						Previous repair	717	05/30/2007	TIMELY				
						Tighten packing	592	05/31/2007	TIMELY				
0118NSPSLL00547	VALVE	3RD LEVEL FROM TOP OF 118D-4 E SIDE	05/16/2007	8,326	05/24/2007	Tighten packing	9,719	05/16/2007	TIMELY	05/31/2007	TIMELY	Yes	NA
						Tighten packing	868	05/21/2007	TIMELY				
						Tighten packing	20,500	05/24/2007	TIMELY				
						Previous repair	112,200	05/30/2007	TIMELY				
						Previous repair	13,800	05/31/2007	TIMELY				
						Cast valve; follower and stud bent -- unsafe to be injected.							
0118NSPSLL00593	VALVE	4TH LEVEL OF 118D-4 E SIDE	05/16/2007	2,831	05/30/2007	Tighten packing	1,640	05/16/2007	TIMELY	05/31/2007	TIMELY	Yes	NA
						Tighten packing	2,538	05/21/2007	TIMELY				
						Tighten packing	6,373	05/24/2007	TIMELY				
						Previous repair	18,100	05/30/2007	TIMELY				
						Inject	295	05/31/2007	TIMELY				
0119NSPSGV00080	VALVE	CTV PV-2400 NW SIDE OF F-21 C	02/26/2008	63,900	02/26/2008	Steam packing	69,100	02/26/2008	TIMELY	03/12/2008	TIMELY	Yes	NA
						Previous repair	42,000	03/06/2008	TIMELY				
						Previous repair	5,924	03/10/2008	TIMELY				
						Tighten packing	5,185	03/12/2008	TIMELY				
						Control valve - can not inject							
0120NSPSLL00540	VALVE	SE SIDE OF 120E-511B INLINE BLOCK V	3/3/2011	24,600	3/3/2011	Steam packing	5,004	3/3/2011	TIMELY	3/15/2011	TIMELY	Yes	NA
						Tighten packing	4,227	3/3/2011	TIMELY				
0120NSPSLL00834	VALVE	CONTROL LOOP 120TV-5629 AT 120E-526 LOW POINT BLEEDER	6/23/11	1,560		Tightened	706	6/27/2011	Not > 10,000	7/8/2011	TIMELY	Yes	NA
						Tightened	816	6/29/2011					

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0120NSPSLL00848	VALVE	CONTROL LOOP 120FV-145 N SIDE OF 120F-509A INLINE BLOCK ON BYPASS	3/4/2011	2170	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	03/18/2011	TIMELY	Yes	NA
403658 (U121)	VALVE	TOP OF PLATFORM E SIDE OF UNIT LADDER 5FT N OF 121F-52 KNOCK OUT DRUM 121SV-1920	8/22/11	5172	8/24/2011	Tightened	8438	08/22/2011	NA	08/30/2011	TIMELY	Yes	NA
						Tightened	25000	08/24/2011	NA				
						This is a knife that can not be injected.							
0122HONGV00195	VALVE	S END OF 122EH-13	08/22/2006	2,846	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	09/01/2006	TIMELY	Yes	NA
0122HON GV00216	VALVE	CTL N SIDE OF 122FH-7 BYPASS	01/18/2008	807	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	01/29/2008	TIMELY	Yes	NA
0122HONGV00254	VALVE	AT CTL 122PV-419 W OF 122FH-9	10/11/2007	607	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/26/2007	TIMELY	Yes	NA
0122HONGV00262	VALVE	AT CTL 122PV-419 W OF 122FH-9	07/07/2008	857	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	07/16/2008	TIMELY	Yes	NA
0122HONGV00279	CONECT	AT 122EH-16 FLNG	01/12/2007	1,158	01/16/2007	Not a Valve	Not a Valve	Not a Valve	Not a Valve	01/18/2007	TIMELY	Yes	NA
0122HONGV00280	CONECT	AT 122EH-16 FLNG	01/12/2007	1,205	NA	Not a Valve	Not a Valve	Not a Valve	Not a Valve	01/18/2007	TIMELY	Yes	NA
0122HONGV00286	CONECT	AT 122EH-10 FLNG	01/12/2007	979	02/20/2007	Not a Valve	Not a Valve	Not a Valve	Not a Valve	01/18/2007	TIMELY	Yes	NA
0122HONGV00298	CONECT	AT 122EH-10 FLNG	01/12/2007	978	02/20/2007	Not a Valve	Not a Valve	Not a Valve	Not a Valve	01/18/2007	TIMELY	Yes	NA
0122HONGV00394	VALVE	TOP OF 122DH-1B OVER N. RAIL	07/20/2007	616	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/03/2007	TIMELY	Yes	NA
0122HONGV00395	VALVE	TOP OF 122DH-1B	10/11/2007	16,100	10/25/2007	Tighten packing	5,820	10/11/2007	TIMELY	10/26/2007	TIMELY	Yes	NA
						Tighten packing	2,825	10/16/2007	TIMELY				
						Tighten packing	1,064	10/18/2007	TIMELY				
						Sealant	9,396	10/22/2007	TIMELY				
						Inject	14,700	10/25/2007	TIMELY				
0122HONGV00721	VALVE	SW SIDE OF 122EU-25 LANDING 3	05/19/2008	657	na	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/03/2008	TIMELY	Yes	NA
0122HONGV00738	VALVE	CTV 122LV-2766 ON W SIDE OF 122DU-2 AT 3RD LANDING	06/19/2006	2,101	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/27/2006	TIMELY	Yes	NA
0122HONGV00832	VALVE	E SIDE OF 122EH-4 TOP OF SG	07/24/2008	5,457	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	11/02/2006	TIMELY	Yes	NA
0122HONGV00833	VALVE	E SIDE OF 122EH-4 TOP OF SG	10/18/2006	611	10/26/2006	Steam packing	621	10/18/2006	TIMELY	11/02/2006	TIMELY	Yes	NA
						Previous repair	2,033	10/20/2006	TIMELY				
						Previous repair	1,988	10/23/2006	TIMELY				
						Previous repair	1,824	10/24/2006	TIMELY				
						Tighten packing	1,301	10/25/2006	TIMELY				
						Previous repair	32,000	10/26/2006	TIMELY				
						Tighten packing	688	10/27/2006	TIMELY				
						Previous repair	15,900		TIMELY				
						Previous repair	1,336	10/30/2006	TIMELY				
						Inject	846	11/01/2006	TIMELY				
						Previous repair	2,883	11/02/2006	TIMELY				
0122HONLL00055	PUMP	122GH-8A PUMP	06/10/2010	2,878	NA	Not a Valve	Not a Valve	Not a Valve	Not a Valve	06/25/2010	TIMELY	Yes	Yes
0122HONLL00805	VALVE	BETWEEN 3RD AND 4TH LANDING OF 122DH-1	08/31/2006	31,800	08/31/2006	Tighten packing	2,761	09/01/2006	TIMELY	09/14/2006	TIMELY	Yes	NA
						Previous repair	9,373	09/05/2006	TIMELY				
						Tighten packing	15,000	09/12/2006	TIMELY				
						Previous repair	808	09/13/2006	TIMELY				

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						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0122HONLL00958	CONECT	E SIDE OF EH-1 ON CTL 22FV-201 (SCREWED FITTING)	09/30/2008	72,000	09/30/2008	Not a Valve	Not a Valve	Not a Valve	Not a Valve	10/13/2008	TIMELY	Yes	NA
0122HONLL00960	VALVE	CTL 122FRC-201 E SIDE OF 122EH-1	05/10/2008	545	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	05/23/2008	TIMELY	Yes	NA
0122HONLL00975	VALVE	BY CTL 122FV-223 W OF 122DH-E CHK	06/10/2009	895	06/13/2009	Steam	1,453	06/10/2009	TIMELY	06/19/2009	TIMELY	Yes	NA
						Tightened	988	06/12/2009					
						Applied sealant	14,900	06/13/2009					
						Previous repair	30,500	06/17/2009					
						Leak source is a screwed fitting that cannot be injected.							
0122HONLL01021	VALVE	BY 122LV-805 W OF 122EH-3 LPB	07/10/2007	58,500	07/10/2007	Steam packing	17,500	07/10/2007	TIMELY	07/25/2007	TIMELY	Yes	NA
						Tighten packing	6,763	07/13/2007	TIMELY				
						Steam packing	3,537	07/19/2007	TIMELY				
						Tighten packing	1,261	07/20/2007	TIMELY				
						Previous repair	15,400	07/25/2007	TIMELY				
						Valve had previously been injected.							
0122HONLL01062	VALVE	S OF 122GH-4A OH ORIFICE TAP	09/17/2007	1,187	09/25/2007	Steam packing	1,262	09/17/2007	TIMELY	09/27/2007	TIMELY	Yes	NA
						Re-inject	1,878	09/22/2007	TIMELY		TIMELY	Yes	
						Tighten packing	69,000	09/25/2007	TIMELY		TIMELY	Yes	
						Valve had previously been injected.					TIMELY	Yes	
0122HONLL01112	VALVE	PUMP 122GH-4A	10/03/2006	15,398	10/03/2006	Inject	2,204	10/07/2006	TIMELY	10/18/2006	TIMELY	Yes	NA
						Sealant	3,625	10/09/2006	TIMELY				
						Previous repair	2,165	10/10/2006	TIMELY				
						Sealant	573	10/10/2006	TIMELY				
						Previous repair	844	10/11/2006	TIMELY				
						Previous repair	2,186	10/13/2006	TIMELY				
						Tighten fitting	748	10/16/2006	TIMELY				
						Re-inject	3,451	10/17/2006	TIMELY				
0122HONLL01146	VALVE	BETWEEN 3RD AND 4TH LANDING AT 122DH-3	01/29/2008	629	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	02/13/2008	TIMELY	Yes	NA
0122HONLL01148	VALVE	AT 122DH-3 3RD LANDING OUTSIDE LADDER	08/31/2006	7,434	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	09/14/2006	TIMELY	Yes	NA
0122HONLL01152	VALVE	1ST LANDING OF 122DH-3 BLOCK VALVE FOR STEAMOUT LINE	07/07/2008	615	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	07/16/2008	TIMELY	Yes	NA
0122HONLL01158	VALVE	W SIDE OF 122DH-3 ABOVE SG	08/19/2006	785	08/23/2006	Tighten	530	08/19/2006	TIMELY	09/01/2006	TIMELY	Yes	NA
						Previous repair	840	08/21/2006	TIMELY				
						Previous repair	629	08/22/2006	TIMELY				
						Previous repair	10,600	08/23/2006	TIMELY				
						Tighten	541	08/30/2006	TIMELY				
						Previous repair	665	09/01/2006	TIMELY				
						Previous repair	621	09/05/2006					
						Previous repair	576	09/06/2006					
						Previous repair	650	09/07/2006					

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						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0122HONLL01192	VALVE	AT 122EH-6 SG	06/18/2008	2,409	06/18/2008	Tighten packing	21,800	06/18/2008	TIMELY	07/02/2008	TIMELY	Yes	NA
						Sealant	157,000	06/20/2008	TIMELY				
						Previous repair	5,869	07/02/2008	TIMELY				
						Previous repair	80,400	07/02/2008	TIMELY				
						Leak source is screwed injector fitting from prior injection. Cannot be injected.							
0122HONLL01562	VALVE	E OF 122GH-6A	01/30/2008	64,100	01/30/2008	Tighten plug	1,786	01/30/2008	TIMELY	02/13/2008	TIMELY	Yes	NA
						Applied sealant	66,900	02/07/2008	TIMELY				
						Tighten plug	7,454	02/11/2008	TIMELY				
						Leak source is plug, Cannot be injected.							
0122HONLL01568	VALVE	AT CTL FV-210 E OF 122GH-6A LPB	05/13/2008	180,100	05/13/2008	Tighten plug	208,300	05/13/2008	TIMELY	05/28/2008	TIMELY	Yes	NA
						Replaced plug	546	05/16/2008	TIMELY				
						Tighten plug	100,000	05/20/2008	TIMELY				
						Leak source is plug. Cannot be injected							
0122HONLL01596	VALVE	AT PUMP 122GH-3A	06/06/2007	523	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/19/2007	TIMELY	Yes	NA
0122HONLL01699	VALVE	PUMP 122GU-19B	04/01/2008	2,008	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	04/16/2008	TIMELY	Yes	NA
0122HONLL01750	CONECT	CENTER OF TKA-1 ON TOP FLNG	04/07/2009	100,000	04/07/2009	Not a Valve	Not a Valve	Not a Valve	Not a Valve	04/22/2009	TIMELY	Yes	NA
0122HONLL01886	VALVE	NE SIDE OF 122TKA-4	08/24/2006	9,800	08/24/2006	Tighten flange	10,300	08/24/2006	TIMELY	09/06/2006	TIMELY	Yes	NA
						Sealant	4,911	08/31/2006	TIMELY				
						Previous repair	4,921	09/05/2006	TIMELY				
						Previous repair	14,100	09/06/2006	TIMELY				
						Leak source was the flange of the valve							
0122HONLL02170	CONECT	W SIDE OF DU-1 TOWER 2ND LANDING FROM EU-1	10/28/2008	17,000	10/28/2008	Not a Valve	Not a Valve	Not a Valve	Not a Valve	11/12/2008	TIMELY	Yes	NA
0122HONLL02268	VALVE	E SIDE OF 122EU-2a EXCHANGER 7 FT OH	07/21/2008	3,362	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/01/2008	TIMELY	Yes	NA
0122HONLL02306	CONECT	N SIDE OF EU-2 EXCHANGER HEADER BOX	04/29/2009	3,915	NA	Not a Valve	Not a Valve	Not a Valve	Not a Valve	05/14/2009	TIMELY	Yes	NA
0122HONLL02309	CONECT	N SIDE OF EU-2 EXCHANGER HEADER BOX	04/19/2007	1,011	NA	Not a Valve	Not a Valve	Not a Valve	Not a Valve	05/04/2007	TIMELY	Yes	NA
0122HONLL02497	CONECT	N SIDE OF BTMS COOLER AND EP-12 TOP LANDING UNION	07/15/2009	17,200	NA	Not a Valve	Not a Valve	Not a Valve	Not a Valve	07/30/2009	TIMELY	Yes	NA
0122HONLL02799	VALVE	AT CTL 122PV-2396 W SIDE OF 122EU-16	10/09/2006	590	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/24/2006	TIMELY	Yes	NA
0122HONLL02901	VALVE	ON CTL PV-384 TOP OF FH-10	04/11/2008	8,244	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	04/25/2008	TIMELY	Yes	NA
0122HONLL02904	VALVE	AT CTL 122PV-384 TOP OF 122FH-10	08/21/2006	16,700	08/21/2006	Tighten flange	3,342	08/21/2006	TIMELY	09/01/2006	TIMELY	Yes	NA
						Previous repair	3,800	08/22/2006	TIMELY				
						Previous repair	20,000	08/23/2006	TIMELY				
						Previous repair	2,265	09/01/2006	TIMELY				
						Previous repair	25,000	09/05/2006					
						Previous repair	4,012	09/06/2006					
						Previous repair	7,742	09/07/2006					
0122HONLL03105	CONECT	4 FT BELOW W SIDE OF 122EP-4 UNION	04/29/2008	5,016	04/29/2008	Not a Valve	Not a Valve	Not a Valve	Not a Valve	05/08/2008	TIMELY	Yes	NA

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						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0122HONLL03117	VALVE	5 FT S OF 122GP-5A PUMP 20FT OH ORIFICE TAPS	04/28/2008	772	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	05/13/2008	TIMELY	Yes	NA
0122HONLL03451	VALVE	W SIDE OF 122DU-22 10FT OH	12/05/2006	785	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	12/20/2006	TIMELY	Yes	NA
0122HONLL03471	VALVE	W OF 122DU-22 N SIDE OF CTL 122FV-149	07/18/2006	1,127	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/02/2006	TIMELY	Yes	NA
0122HONLL03480	VALVE	S SIDE OF CTL 122LV-149 W OF 122DU-22	07/11/2007	748	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	07/25/2007	TIMELY	Yes	NA
0122HONLL03485	VALVE	W SIDE OF DU-22 N SIDE OF BOX	04/04/2008	812	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	04/21/2008	TIMELY	Yes	NA
0122HONLL04316	VALVE	BELOW E SIDE OF EU-24 ORIFICE TAP OF FT 2263	04/29/2008	19,400	04/29/2008	Tighten packing	1,553	04/29/2008	TIMELY	05/13/2008	TIMELY	Yes	NA
						Tighten packing	1,860	05/05/2008	TIMELY				
						Applied sealant	1,930	05/07/2008	TIMELY				
0122NSPSGV00380	VALVE	ON CTL 122PRC-2308A N OF 122EU-2	10/10/2006	2,198	09/26/2006	Steam packing	100,000	09/26/2006	TIMELY	10/11/2006	TIMELY	Yes	NA
						Previous repair	1,595	09/28/2006	TIMELY				
						Previous repair	1,001	09/29/2006	TIMELY				
						Previous repair	1,001	10/02/2006	TIMELY				
						Previous repair	782	10/03/2006	TIMELY				
						Previous repair	1,203	10/04/2006	TIMELY				
						Previous repair	993	10/05/2006	TIMELY				
						Previous repair	1,506	10/06/2006	TIMELY				
						Previous repair	2,415	10/09/2006	TIMELY				
						Previous repair	740	10/10/2006	TIMELY				
0122NSPSLL00117	VALVE	W SIDE OF 122EP-2	07/19/2006	29,400	07/19/2006	Steam packing	30,100	07/19/2006	TIMELY	08/03/2006	TIMELY	Yes	NA
						Previous repair	2,608	07/20/2006	TIMELY				
						Previous repair	10,700	07/21/2006	TIMELY				
						Previous repair	5,200	07/24/2006	TIMELY				
						Previous repair	2,106	07/25/2006	TIMELY				
						Previous repair	11,700	08/01/2006	TIMELY				
						Previous repair	9,806	08/02/2006	TIMELY				
						Previous repair	11,800	08/03/2006	TIMELY				
						Leak source in the injector itself							
0123CR1GV00279	VALVE	NE SIDE OF B-2 3RD LEVEL	11/10/2009	2,034	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	11/25/2009	TIMELY	Yes	NA
0125NSPSGV00114	VALVE	BOTTOM OF B-2 BURNER 11 HPB	02/05/2009	1,670	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	02/20/2009	TIMELY	Yes	NA
0125NSPSGV00218	VALVE	W END OF BATT LIMITS 1ST LANDING	08/24/2007	2,527	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	09/08/2007	TIMELY	Yes	NA
0125NSPSGV00317	VALVE	BETWEEN 25B-1 AND 25D-1 BETWEEN PS41 AND PS40 CHK	05/27/2009	10,500	05/27/2009	Steamed	38,500	05/27/2009	TIMELY	06/11/2009	TIMELY	Yes	NA
						Tightened	5,000	05/29/2009	TIMELY				
						Tightened	27,700	06/11/2009	TIMELY				
						Valve is a check valve. Check valves cannot be injected.							

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						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0125NSPSGV00535	VALVE	WEST SIDE OF COMPRESSOR 125GB-5 ON LANDING	07/14/2008	41,000	07/14/2008	Steamed	no remonitor that day	07/14/2008	TIMELY	07/28/2008	TIMELY	Yes	NA
						Applied sealant	13000	07/18/2008	TIMELY				
						Previous repair	100000	07/19/2008	TIMELY				
						Applied sealant	100000	07/22/2008	TIMELY				
						Leak source was a screwed fitting (union) on valve. Not injectable.							
110806	VALVE	102 W SIDE BATTERY LIITS BY PS02 OH BOTTOM ROW	03/24/2008	5,981	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	04/08/2008	TIMELY	Yes	NA
110817	VALVE	102 W SIDE BATTERY LIMITS BY PS02 OH BOTTOM LEVEL HPB	04/23/2009	766	na	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	05/06/2009	TIMELY	Yes	NA
15586	VALVE	W SIDE OF TK 432 IN PIPEROW E OF 331G-9A OH CHAIN OPERATED	07/30/2009	100,000	07/30/2009	Tightened packing	100000	07/30/2009	TIMELY	08/14/2009	TIMELY	Yes	NA
						Tightened packing	35000	08/03/2009	TIMELY				
						Injected	100000	08/06/2009	TIMELY				
						Steam	8497	08/07/2009	TIMELY				
						Injected	15000	08/10/2009	TIMELY				
						Injected	1750	08/12/2009	TIMELY				
						Previous repair	3154	08/13/2009	TIMELY				
						Previous repair	992	08/14/2009	TIMELY				
16523	VALVE	SE OF 334 LOADING RACK OH DTM BY PS22	09/14/2009	28,200	09/14/2009	Tightened packing	38700	09/14/2009	TIMELY	09/29/2009	TIMELY	Yes	NA
						Tightened packing	1285	09/16/2009	TIMELY				
						Tightened packing	3583	09/23/2009	TIMELY				
0212NSPSGV00124	VALVE	212d-403A, 3FT NW OF 212D-403A 4FT OFF THE GROUND	10/05/2011	69,200	10/05/2011	Steam	100,000	10/05/2011	NA	10/18/2011	TIMELY	Yes	NA
						Orbit valve - Non-injectable							
0212NSPSGV00127	VALVE	212D-403A ON CONTROL LOOP 212CV-995A 3FT NE OF 212D-403A	10/05/2011	44,100	10/05/2011	Steam	48,000	10/05/2011	NA	10/18/2011	TIMELY	Yes	NA
						Orbit valve - Non-injectable							
0212NSPSGV00212	Valve	212D-403B 3ft NW of 212D-403B 212HV-997B gas dryer outlet 3ft off ground	09/19/2011	100,000	09/19/2011	Steam	100,000	09/19/2011	TIMELY	10/03/2011	TIMELY	Yes	NA
						Steam	100,000	09/19/2011					
						Tightened	6000	09/20/2011					
						Orbit valve - non-injectable.							
0212NSPSGV00351	Valve	N SIDE OF 212GB-301 2ND LANDING HIGH POINT BLEEDER	06/23/2011	48,500	06/23/2011	Steam	34,000	06/23/2011	Not Injectable	07/07/2011	TIMELY	Yes	NA
						Applied sealant	12,700	06/27/2011					
						Tightened	32,700	07/01/2011					
						Tightened	13,200	07/05/2011					
						Applied sealant	11,300	07/06/2011					
						Leak source was the plug of the valve. Not injectable.							

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15851	Valve	20FT W OF 212G-8A OVERHEAD	06/22/2011	11,900	06/22/2011	Tightened	18,800	06/22/2011	Not Injectable	07/07/2011	TIMELY	Yes	NA
						Applied sealant	100,000	06/24/2011					
						Applied sealant	100,000	07/01/2011					
						Tightened	100,000	07/05/2011					
						Applied sealant	79,700	07/06/2011					
						Valve is a orifice tap (HEX). Not injectable.							
0217NSPSLL00778	VALVE	3FT NW OF 217D-9 AT 217FT-141 OVER	6/10/2011	7766	6/14/2011	Steam Plug	2311	6/10/2011	NA	6/24/2011	TIMELY	Yes	NA
						Tighten plug	100000	6/14/2011	NA				
						Steam Plug	100000	6/14/2011	NA				
						► Leak source was plug of valve - no injection							
						Tighten plug	56,900	07/12/2007	TIMELY				
						Replace plug	22,000	07/16/2007	TIMELY				
						Previous repair	55,200	07/25/2007	TIMELY				
						Leak source was plug on valve -- not injectable.							
0217NSPSGV00202	VALVE	CTV PV-444 5FT W OF 217E-19D2 1ST LANDING	10/07/2008	100,700	10/07/2008	Cleaned		10/07/2008	TIMELY	10/31/2008	TIMELY	Yes	NA
						Previous repair	18,300	10/08/2008	TIMELY				
						Previous repair	4,030	10/21/2008	TIMELY				
						Control valve - not injectable							
0217NSPSGV00555	VALVE	ON CTL FV-176	05/26/2006	7,998	06/01/2006	Tighten flange	7,800	05/26/2006	TIMELY	06/05/2006	TIMELY	Yes	NA
						Previous repair	3,640	05/31/2006	TIMELY				
						Tighten packing	3,509	06/01/2006	TIMELY				
						Previous repair	30,500	06/02/2006	TIMELY				
						Previous repair	41,200	06/05/2006	TIMELY				
						Ball valve -- can not inject							
0217NSPSGV00556	VALVE	NE SIDE OF 217D-7 AT SG OH	10/24/2008	3,957	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	11/05/2008	TIMELY	Yes	NA
0217NSPSGV00613	VALVE	SW SIDE OF F-103 AT SG	04/16/2008	1,237	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	05/01/2008	TIMELY	Yes	NA
0217NSPSLL00223	VALVE	N SIDE OF 217G-17 AT FT-158 OH	07/25/2007	9,139	07/25/2007	Steam packing	80,900	07/25/2007	TIMELY	08/01/2007	TIMELY	Yes	NA
						Tighten packing	10,000	07/27/2007	TIMELY				
						Previous repair	6,900	08/02/2007	TIMELY				
						Tighten packing	2,900	08/02/2007	TIMELY				
0217NSPSLL00620	VALVE	NE SIDE OF D-5 2ND LANDING	07/12/2006	1,616	07/25/2006	Tighten bonnet	2,093	07/12/2006	TIMELY	07/24/2006	TIMELY	Yes	NA
						Previous repair	1,250	07/13/2006	TIMELY				
						Previous repair	640	07/14/2006	TIMELY				
						Previous repair	893	07/17/2006	TIMELY				
						Previous repair	1,077	07/18/2006	TIMELY				
						Previous repair	566	07/19/2006	TIMELY				
						Previous repair	1,149	07/20/2006	TIMELY				
						Previous repair	643	07/21/2006	TIMELY				
						Inject	9,393	07/24/2006	TIMELY				
						Previous repair	184,500	07/25/2006					
						Leak source was bonnet of valve, injected only once because the leak was worsening							
0217NSPSLL00966	VALVE	W SIDE OF 217D-1	07/08/2008	1,114	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	07/23/2008	TIMELY	Yes	NA

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0217NSPSLL01003	VALVE	TOP N SIDE OF 217E-7B OH	07/24/2007	2,900	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/09/2007	TIMELY	Yes	NA
0217NSPSLL01016	VALVE	AT G-6B	07/12/2007	1,308	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	07/27/2007	TIMELY	Yes	NA
0217NSPSLL01075	VALVE	E SIDE OF 217E-7A	10/04/2007	530	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/16/2007	TIMELY	Yes	NA
0217NSPSLL00491	VALVE	217XV-1920 TOP E SIDE OF 217D-401A ON PROPANE SKID	09/28/2011	29,200	09/28/2011	Steam	790	09/28/2011	NA	10/11/2011	TIMELY	Yes	NA
						Tightened	1476	09/29/2011					
						Tightened	100,000	09/30/2011					
						Previous repair	12,100	10/03/2011					
						Tightened	26,000	10/04/2011					
						► Switch valve - can not inject							
0217NSPSLL00513	VALVE	217XV-1920 TOP E SIDE OF 217D-401A ON PROPANE SKID	09/28/2011	1,833	09/28/2011	Steam	938	09/28/2011	NA	10/11/2011	TIMELY	Yes	NA
						Tightened	1995	09/29/2011					
						Tightened	2,031	09/30/2011					
						Previous repair	1,741	10/03/2011					
						Tightened	3,702	10/04/2011					
0217NSPSLL01100	RELIEF	PRV SV-031 TOP N SIDE OF 217E-7B OH	07/24/2007	11,000	07/24/2007	Steam	5,500	07/24/2007	TIMELY	08/08/2007	TIMELY	Yes	NA
						Previous repair	6,372	08/06/2007	TIMELY				
						Apply sealant	13,350	08/08/2007	TIMELY				
						Leak source is cap on PRV - not injectable							
0217NSPSLL01111	VALVE	ON CTL 217TV-515B E SIDE OF 217D-2	05/17/2007	675	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	05/31/2007	TIMELY	Yes	NA
0217NSPSLL01126	VALVE	W SIDE OF 217D-2 OH	08/09/2007	2,132	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/17/2007	TIMELY	Yes	NA
0217NSPSLL01136	VALVE	BYPASS FOR CONTROL VALVE 217FV-109 5FT E OF 217G-11B	12/27/2006	720	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	01/11/2007	TIMELY	Yes	NA
0228NSPSLL00066	VALVE	E SIDE OF PUMP 228G-2 FCC BLENDING BLOCK FOR FILTER	02/13/2007	787	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	02/28/2007	TIMELY	Yes	NA
0228NSPSLL00115	VALVE	1FT W OF PUMP 28G-4	09/22/2006	5,004	09/22/2006	Tighten	17,900	09/22/2006	TIMELY	10/07/2006	TIMELY	Yes	NA
						Previous repair	2,605	09/27/2006	TIMELY				
						Previous repair	4,275	09/28/2006	TIMELY				
						Previous repair	10,500	09/29/2006	TIMELY				
						Previous repair	2,637	10/02/2006	TIMELY				
						Tighten packing	2,343	10/03/2006	TIMELY				
						Tighten packing	783	10/04/2006	TIMELY				
						Inject	1,617	10/05/2006	TIMELY				
						Previous repair	13,200	10/06/2006	TIMELY				
						Previous repair	1,320	10/07/2006	TIMELY				
0228NSPSLL00437	VALVE	5FT E OF PS-143 1ST LANDING	11/05/2008	1,140	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	11/20/2008	TIMELY	Yes	NA
0228NSPSLL00639	VALVE	20 FT NW OF PUMP G-2	08/07/2007	584	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/22/2007	TIMELY	Yes	NA

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0228NSPSLL00700	VALVE	N SIDE OF G-66 CHK	09/22/2006	816,300	09/22/2006	Tighten plug	31,000	09/22/2006	TIMELY	10/07/2006	TIMELY	Yes	NA
						Sealant	2,441	09/26/2006	TIMELY				
						Sealant	28,400	09/27/2006	TIMELY				
						Sealant	9,852	09/28/2006	TIMELY				
						Previous repair	1,090	09/29/2006	TIMELY				
						Previous repair	815	10/02/2006	TIMELY				
						Tightened packing and applied sealant	6,381	10/03/2006	TIMELY				
						Previous repair	1,026	10/04/2006	TIMELY				
						Previous repair	728	10/05/2006	TIMELY				
						Previous repair	850	10/06/2006	TIMELY				
						Tightened plug and applied sealant	2,914	10/07/2006	TIMELY				
						Sealant	584	10/09/2006	TIMELY				
0228NSPSLL00754	VALVE	MOV-265 N SIDE OF G-56	02/15/2008	4,598	02/15/2008	Tighten packing	57,510,000	02/15/2008	TIMELY	02/29/2008	TIMELY	Yes	NA
						Previous repair	7,886	02/27/2008	TIMELY				
						Tighten packing	548	02/27/2008	TIMELY				
						Previous repair	613	02/28/2008	TIMELY				
						Previous repair	504	02/29/2008	TIMELY				
0228NSPSLL00842	VALVE	IN SATELLITE E SIDE OF A-901	08/10/2006	4,275	08/22/2006	Tighten	998	08/10/2006	TIMELY	09/09/2006	TIMELY	Yes	NA
						Previous repair	727	08/11/2006	TIMELY				
						Previous repair	730	08/14/2006	TIMELY				
						Previous repair	2,697	08/15/2006	TIMELY				
						Previous repair	2,061	08/16/2006	TIMELY				
						Previous repair	5,112	08/17/2006	TIMELY				
						Previous repair	4,640	08/18/2006	TIMELY				
						Previous repair	678	08/21/2006	TIMELY				
						Previous repair	16,900	08/22/2006	TIMELY				
						Previous repair	3,877	08/23/2006	TIMELY				
						Sealant	7,287	08/24/2006	TIMELY				
						Tighten packing	3,765	08/25/2006	TIMELY				
						Tighten	2,134	09/22/2006	TIMELY				
0228NSPSLL00928	VALVE	NW OF PUMP G-2 ON LAND AT PS-132 N RAIL	11/06/2006	787	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	09/01/2006	TIMELY	Yes	NA
0331HONLL00217	VALVE	SW OF TANK 501 AT CORNER OF ROAD SLOP HEADER	07/28/2006	1,011	08/04/2006	Tighten	2,351	07/28/2006	TIMELY	08/11/2006	TIMELY	Yes	NA
						Previous repair	956	08/01/2006	TIMELY				
						Previous repair	1,924	08/02/2006	TIMELY				
						Previous repair	33,200	08/04/2006	TIMELY				
						Inject	796	08/07/2006	TIMELY				
						Previous repair	7,555	08/08/2006	TIMELY				
						Previous repair	3,001	08/09/2006	TIMELY				
						Previous repair	3,565	08/10/2006	TIMELY				
						Previous repair	1,808	08/11/2006	TIMELY				

ATTACHMENT 9, Appendix C
Delay of Repair Information
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Delay of Repair List

This is a list of those items currently on the Delay of Repair list (as of end of reporting period), placed there since February 28, 2006.

Component Number	Type	Description	Initial Inspection Date	Concentration (ppmv)	Date leaking > 10,000 ppmv	For valves leaking > 10,000 ppmv				Date placed on Delay of Repair	Placed on Delay of Repair by Unit Supervisor w/in 30 days?	Is LDAR monitoring conitinuing while on Delay of Repair	For pumps, were best efforts used to isolate and repair?
						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0331HONLL00538	VALVE	S OF PUMP 18G--115	11/02/2010	100,000	11/02/2010	Steam	100,000	11/02/2010	TIMELY	11/17/2010	TIMELY	Yes	NA
						Sealant	1,034	11/03/2010	TIMELY				
						Sealant	1,481	11/09/2010	TIMELY				
0331HONLL00633	VALVE	MOV-1907-2 E OF SOLVENT RACK PUMP 18G-104	01/14/2008	585	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	01/29/2008	TIMELY	Yes	NA
0331HONLL00690	VALVE	S OF PUMP 18G-115 IN PIPE RACK	08/23/2006	10,100	08/23/2006	Tighten packing	11,000	08/23/2006	TIMELY	09/07/2006	TIMELY	Yes	NA
						Tighten packing	3,389	09/06/2006	TIMELY				
						Inject	4,400	09/07/2006	TIMELY				
0331HONLL00708	VALVE	S SIDE OF 18G-111 SW OF TANK 617 ON PAD	07/27/2006	1,584	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/11/2006	TIMELY	Yes	NA
0331HONLL01025	VALVE	IN GPR ACROSS ROAD W OF TANK 601 E OF SOLVENT RACK	07/27/2006	3,387	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/11/2006	TIMELY	Yes	NA
0331HONLL01035	VALVE	IN GPR ACROSS ROAD W OF TANK 601 E OF SOLVENT RACK	07/27/2006	1,210	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/11/2006	TIMELY	Yes	NA
0331NSPSGV00113	VALVE	N PMP 31G-10	10/06/2006	6,848	10/06/2006	Tighten	15,500	10/06/2006	TIMELY	10/21/2006	TIMELY	Yes	NA
						Tightened packing and applied sealant	1,516	10/10/2006	TIMELY				
						Tighten packing	719	10/16/2006	TIMELY				
						Inject	680	10/17/2006	TIMELY				
						Re-inject	1,924	10/19/2006	TIMELY				
						Previous repair	2,572	10/20/2006	TIMELY				
0331NSPSGV00145	RELIEF	(BUTANE SPHERES) PRV TOP OF BUTANE SPHERE 67	01/20/2009	81,400	01/20/2009	Not a Valve	Not a Valve	Not a Valve	Not a Valve	02/04/2009	TIMELY	Yes	NA
0331NSPSLL00349	VALVE	NW SIDE TANK 407	10/19/2006	715	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	11/06/2006	TIMELY	Yes	NA
0331NSPSLL00364	VALVE	TANK 405 SW SIDE MOV-1231	04/24/2007	623	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	05/11/2007	TIMELY	Yes	NA
0331NSPSLL00870	RELIEF	PRV 31SV-488 TANK 302 N SIDE	01/18/2007	5,281	01/18/2007	Not a Valve	Not a Valve	Not a Valve	Not a Valve	02/02/2007	TIMELY	Yes	NA
0331NSPSLL00876	VALVE	ON N SIDE OF TK-208	08/25/2006	10,000	08/25/2006	Tighten	11,500	08/25/2006	TIMELY	09/09/2006	TIMELY	Yes	NA
						Previous repair	3,859	09/09/2006	TIMELY				
0331NSPSLL00892	VALVE	SE END OF PLATFORM N OF BUTANE SPHERE 68	01/09/2008	5,619	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	01/24/2008	TIMELY	Yes	NA
0331NSPSLL00983	VALVE	PUMP PAD SW OF TANK 429 PUMP 35G-3	09/20/2006	2,291	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/05/2006	TIMELY	Yes	NA
0331NSPSLL01001	VALVE	N SIDE OF TANK 402	10/09/2006	525	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/24/2006	TIMELY	Yes	NA
0331NSPSLL01008	RELIEF	PRV 128SV-944 W SIDE OF PUMP 128G-21A NE OF PROPANE BULLETS	08/25/2006	13,800	08/25/2006	Not a Valve	Not a Valve	Not a Valve	Not a Valve	09/09/2006	TIMELY	Yes	NA
0331NSPSLL01012	VALVE	NE OF PUMP 128G-21A NE OF PROPANE BULLETS	10/05/2006	9,285	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/20/2006	TIMELY	Yes	NA

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Delay of Repair Information
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Component Number	Type	Description	Initial Inspection Date	Concentration (ppmv)	Date leaking > 10,000 ppmv	For valves leaking > 10,000 ppmv				Date placed on Delay of Repair	Placed on Delay of Repair by Unit Supervisor w/in 30 days?	Is LDAR monitoring conitinuing while on Delay of Repair	For pumps, were best efforts used to isolate and repair?
						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0331NSPSLL01032	VALVE	W OF PUMP 128G-21B GPR NE OF PROPANE BULLETS	09/21/2006	2,577	10/02/2006	Steam seal	2,753	09/21/2006	TIMELY	10/06/2006	TIMELY	Yes	NA
						Previous repair	4,706	09/25/2006	TIMELY				
						Previous repair	4,840	09/27/2006	TIMELY				
						Previous repair	2,067	09/28/2006	TIMELY				
						Previous repair	868	09/29/2006	TIMELY				
						Previous repair	14,100	10/02/2006	TIMELY				
						Sealant	19,700	10/03/2006	TIMELY				
						Previous repair	11,200	10/04/2006	TIMELY				
						Previous repair	1,259	10/05/2006	TIMELY				
						Previous repair	10,900	10/06/2006	TIMELY				
						Ball valve can not inject							
0331NSPSLL01058	VALVE	NW OF PUMP 128G-21B NE OF PROPANE BULLETS	07/24/2006	1,775	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/08/2006	TIMELY	Yes	NA
0331NSPSLL01087	VALVE	E SIDE PMP 31G-10 PIPE ROW	07/25/2006	13,500	07/25/2006	Tighten flange (valve injected twice previously)	11,900	07/25/2006	TIMELY	08/09/2006	TIMELY	Yes	NA
						Tighten flange	2,059	07/25/2006	TIMELY				
						Previous repair	72,700	07/27/2006	TIMELY				
						Previous repair	90,700	08/01/2006	TIMELY				
						Previous repair	6,281	08/02/2006	TIMELY				
						Tighten flange	5,359	08/04/2006	TIMELY				
						Tighten packing	9,409	08/07/2006	TIMELY				
						Previous repair	6,093	08/08/2006	TIMELY				
						Previous repair	10,100	08/09/2006	TIMELY				
0331NSPSLL01093	VALVE	IN PIPE ROW NE PMP 31G-5	10/05/2006	3,536	10/20/2006	Tighten flange	7,201	10/05/2006	TIMELY	10/20/2006	TIMELY	Yes	NA
						Tighten packing	964	10/12/2006	TIMELY				
						Tighten flange	1,422	10/17/2006	TIMELY				
						Previous repair	67,100	10/20/2006	TIMELY				
						Previous repair	3,476	10/23/2006	TIMELY				

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						For valves leaking > 10,000 ppmv							
Component Number	Type	Description	Initial Inspection Date	Concentration (ppmv)	Date leaking > 10,000 ppmv	Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)	Date placed on Delay of Repair	Placed on Delay of Repair by Unit Supervisor w/in 30 days?	Is LDAR monitoring conitinuing while on Delay of Repair	For pumps, were best efforts used to isolate and repair?
0331NSPSLL01096	VALVE	NE OF PUMP G-5 IN PIPE ROW E OF PROPANE BULLETS	07/31/2006	2,088	08/08/2006	Tighten flange	2,935	07/31/2006	TIMELY	08/15/2006	TIMELY	Yes	NA
						Previous repair	2,090	08/01/2006	TIMELY				
						Previous repair	7,190	08/02/2006	TIMELY				
						Previous repair	5,784	08/04/2006	TIMELY				
						Tighten packing	9,400	08/07/2006	TIMELY				
						Previous repair	41,100	08/08/2006	TIMELY				
						Previous repair	6,285	08/09/2006	TIMELY				
						Previous repair	16,000	08/10/2006	TIMELY				
						Previous repair	3,347	08/11/2006	TIMELY				
						Previous repair	34,700	08/14/2006	TIMELY				
						Previous repair	3,544	08/15/2006	TIMELY				
						Sealant	13,700	08/16/2006	TIMELY				
						Previous repair	109,900	08/17/2006	TIMELY				
						Leak source was the valve flange							
0331NSPSLL01126	VALVE	CTV PCV-319. BUTANE SPHERES SE OF SPHERE 66	10/22/2007	7,790	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	11/13/2007	TIMELY	Yes	NA
0331NSPSLL01136	RELIEF	PRV 131SV-2902 CTL NE OF BUTANE SPHERE 65	06/29/2006	97,100	06/29/2006	Not a Valve	Not a Valve	Not a Valve	Not a Valve	07/14/2006	TIMELY	Yes	NA
0331NSPSLL01149	VALVE	BUTANE SPHERES E SIDE OF SPHERE 67	07/26/2007	1,575	07/26/2007	Tighten packing	10,300	07/26/2007	TIMELY	08/10/2007	TIMELY	Yes	NA
						Previous repair	893	08/07/2007	TIMELY				
						Previous repair	527	08/10/2007	TIMELY				
0331NSPSLL01203	VALVE	N OF TANK 437	08/26/2006	4,329	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	09/09/2006	TIMELY	Yes	NA
0331NSPSLL01456	VALVE	NW OF PUMP 128G-21B NE OF PROPANE BULLETS	09/21/2006	1,334	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/06/2006	TIMELY	Yes	NA
0331NSPSLL01461	VALVE	NW OF PUMP 128G-21B NE OF PROPANE BULLETS	11/20/2006	865	12/01/2006	Tighten	718	11/20/2006	TIMELY	12/05/2006	TIMELY	Yes	NA
						Previous repair	637	11/22/2006	TIMELY				
						Tighten packing	908	11/27/2006	TIMELY				
						Previous repair	718	11/30/2006	TIMELY				
						Tighten packing	26,100	12/01/2006	TIMELY				
						Previous repair	3,399	12/02/2006	TIMELY				
						Inject	570	12/04/2006	TIMELY				
						Previous repair	659	12/05/2006	TIMELY				
						Re-inject	638	12/06/2006	TIMELY				
0331NSPSLL01519	VALVE	AT PUMP 31G-7 SW OF TK-421	11/20/2006	688	11/20/2006	Tighten	10,300	11/20/2006	TIMELY	12/05/2006	TIMELY	Yes	NA
						Previous repair	771	11/22/2006	TIMELY				
						Previous repair	2,485	11/29/2006	TIMELY				
						Tighten packing	1,165	11/30/2006	TIMELY				
						Previous repair	1,291	12/01/2006	TIMELY				
						Previous repair	659	12/04/2006	TIMELY				
						Previous repair	959	12/05/2006	TIMELY				
						Inject	722	12/06/2006	TIMELY				

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This is a list of those items currently on the Delay of Repair list (as of end of reporting period), placed there since February 28, 2006.

Component Number	Type	Description	Initial Inspection Date	Concentration (ppmv)	Date leaking > 10,000 ppmv	For valves leaking > 10,000 ppmv				Date placed on Delay of Repair	Placed on Delay of Repair by Unit Supervisor w/in 30 days?	Is LDAR monitoring conitinuing while on Delay of Repair	For pumps, were best efforts used to isolate and repair?
						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0331NSPSLL01535	VALVE	UNDER NW END OF PLAT S SIDE OF LADDER MOV-1274 SPHERES	12/08/2009	3,463	12/08/2009	Steamed	19,100	12/08/2010	TIMELY	12/23/2009	TIMELY	Yes	NA
						Applied sealant	1,895	12/10/2010	TIMELY				
						Previous repair	10,400	12/22/2010	TIMELY				
						Previous repair	100,000	12/23/2010	TIMELY				
						Valve is a Motor Operated Valve, and injection of this valve would have rendered it mechanically inoperable.							
0331NSPSLL01540	VALVE	UNDER NW END OF PLAT E SIDE OF LADDER MOV-1273 SPHERES	04/09/2007	651	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	04/13/2007	TIMELY	Yes	NA
0331NSPSLL01547	RELIEF	PRV 131SV-975 W OF BUTANE SPHERE 68 IN AND UNDER PR	06/29/2006	7,121	06/29/2006	Not a Valve	Not a Valve	Not a Valve	Not a Valve	07/14/2006	TIMELY	Yes	NA
0331NSPSLL01770	RELIEF	PRV SV-1959 SW OPF TANK 609 ON S SIDE PMP	01/17/2007	20,500	01/17/2007	Not a Valve	Not a Valve	Not a Valve	Not a Valve	02/01/2007	TIMELY	Yes	NA
0331NSPSLL01856	VALVE	WLODARSKI JUNCTION W TO E	09/22/2006	627	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/07/2006	TIMELY	Yes	NA
0331NSPSLL01874	VALVE	N OF PUMP 31G-12	09/21/2006	13,600	09/21/2006	Tighten	8,953	09/21/2006	TIMELY	10/06/2006	TIMELY	Yes	NA
						Previous repair	16,500	09/25/2006	TIMELY				
						Previous repair	6,929	09/27/2006	TIMELY				
						Previous repair	6,069	09/28/2006	TIMELY				
						Previous repair	7,424	09/29/2006	TIMELY				
						Previous repair	5,864	10/02/2006	TIMELY				
						Tightened packing and applied sealant	8,149	10/03/2006	TIMELY				
						Previous repair	45,720	10/04/2006	TIMELY				
						Inject	1,267	10/05/2006	TIMELY				
						Inject	1,219	10/06/2006	TIMELY				
0331NSPSLL01908	VALVE	ON PLATFORM N OF BUTANE SPHERE 68	07/25/2008	1,505	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/09/2008	TIMELY	Yes	NA
0331NSPSLL01911	VALVE	331MOV-1265 NE END OF PLATFORM AT N SIDE OF BUTANE SPHERES	06/26/2007	6,357	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	07/24/2007	TIMELY	Yes	NA
0331NSPSLL01924	RELIEF	PRV 31SV-4016 E OF & OFF PLATFORM NORTH OF SPHERES	10/23/2007	4,453	NA	Not a Valve	Not a Valve	Not a Valve	Not a Valve	12/06/2007	LATE	Yes	NA
0331NSPSLL01938	VALVE	E OF PLATFORM N OF BUTANE SPHERE 68	04/08/2008	2,185	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	04/24/2008	TIMELY	Yes	NA
0331NSPSLL02111	VALVE	E OF TANK 432 PMP 31G-9A	04/15/2009	565	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	04/30/2009	TIMELY	Yes	NA
0331NSPSLL02221	VALVE	PUMP 31G-19B	10/20/2008	63,700	10/20/2008	Steam seal	27100	10/20/2008	TIMELY	11/05/2008	TIMELY	Yes	NA
						Tighten packing	923	10/21/2008	TIMELY				
						Tighten packing	2000	10/23/2008	TIMELY				
						Apply sealant	7653	10/27/2008	TIMELY				
						Previous repair	1164	11/04/2008	TIMELY				

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Component Number	Type	Description	Initial Inspection Date	Concentration (ppmv)	Date leaking > 10,000 ppmv	For valves leaking > 10,000 ppmv				Date placed on Delay of Repair	Placed on Delay of Repair by Unit Supervisor w/in 30 days?	Is LDAR monitoring conitinuing while on Delay of Repair	For pumps, were best efforts used to isolate and repair?
						Repair Method	Monitoring results	Date of Repair Attempt	If injection or equivalent, timely? (i.e., injection or equivalent within 30 days)				
0331NSPSLL02462	VALVE	SE OF TK-480 AT CTL BY ROAD W OF PUMP 31G-409	10/05/2006	682	10/20/2006	Tighten	611	10/05/2006	TIMELY	10/20/2006	TIMELY	Yes	NA
						Re-inject	558	10/16/2006	TIMELY				
						Re-inject	1,044	10/17/2006	TIMELY				
						Re-inject	3,115	10/19/2006	TIMELY				
						Previous repair	20,300	10/20/2006	TIMELY				
0331NSPSLL02473	VALVE	CTL BY ROAD W OFPMP 31G 409	10/05/2006	1,666	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/20/2006	TIMELY	Yes	NA
0331NSPSLL02627	VALVE	S OF TANK 484 IN PIPE ROW CHK	07/26/2006	2,128	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	08/11/2006	TIMELY	Yes	NA
0331NSPSLL02632	VALVE	AT W SIDE OF TK-480	09/21/2006	830	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/06/2006	TIMELY	Yes	NA
0331NSPSLL02737	VALVE	SW SIDE OF TANK 406	08/29/2006	5,619	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	09/09/2006	TIMELY	Yes	NA
0331NSPSLL02908	VALVE	UNDER SPHERE TK-488	08/25/2006	1,460	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	09/09/2006	TIMELY	Yes	NA
0331NSPSLL02910	VALVE	BOTTOM OF SPHERE TK-488	11/20/2006	1,076	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	12/05/2006	TIMELY	Yes	NA
0331NSPSLL02912	VALVE	UNDER SPHERE TK-488	08/25/2006	12,400	08/25/2006	Tighten flange	10,200	08/25/2006	TIMELY	09/09/2006	TIMELY	Yes	NA
						Tighten flange	60,700	09/09/2006	TIMELY				
17812 (formerly 0331NSPSLL00702)	VALVE	AT E SIDE OF TK-439	10/04/2006	1,421	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	10/19/2006	TIMELY	Yes	NA
16525	VALVE	SE OF 334 LOADING RACK OH DTM BY	4/26/2011	97,000	4/26/2011	Tightened Packing	71500	4/26/2011	Damaged Follo	5/11/2011	TIMELY	Yes	NA
0334NSPSLL00029	VALVE	E OF 34F-3 SE OF 34F-4	02/22/2008	3,136	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	03/07/2008	TIMELY	Yes	NA
0334NSPSLL00150	VALVE	LOADING PLAT N OF N LOADING ROOM	05/21/2007	539	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	06/05/2007	TIMELY	Yes	NA
0430NATGAS0038	VALVE	NE OF SATELITE N OF CONTROL LOOP 430PCV-368 OVERHEAD	08/18/2011	32,400	08/18/2011	Tightened	15200	08/18/2011	NA	08/30/2011	TIMELY	Yes	NA
						Applied Sealant	100000	08/22/2011					
						Applied sealant	100000	08/22/2011					
						Applied sealant	2571	08/22/2011					
						Applied sealant	6670	08/22/2011					
0590NSPSGV01163	VALVE	TIGHT SHUT OFF BLOCK ON LINE TO 5	3/22/2011	4,789	NA	Not > 10,000	Not > 10,000	Not > 10,000	Not > 10,000	03/07/2008	TIMELY	Yes	NA

ATTACHMENT 9, Appendix D
Initial Repair Attempt Details
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Period Totals	
Effective	73
Ineffective	117
Worsen	17
Total	207

Category Code
- Effective: <= 200
- Ineffective: Remains between 200 and 499
- Worsen: > 499

Avg conc.change	440	ppmv increase
Avg emis. rate chnge	0.000070	lb/hr/attempt increase
Net emis. rate chnge	0.014473	lb/hr increase

No.	Tag Number	Initial Reading Date	Initial Reading PPM	Initial Repair Attempt Date	Post Attempt Reading Date	Post Attempt Reading PPM	Repair Date Gap	Remonitor Date Gap	Repair Timeliness (OK if ≤ 5)	Remonitor Timeliness (OK if ≤ 5)	Post - Initial Reading	Category
1	0103NSPSLL00035	7/26/2011	316	7/26/2011	7/26/2011	243	0	0	OK	OK	-73	Ineffective
2	0114NSPSLL00057	7/18/2011	260	7/18/2011	7/18/2011	253	0	0	OK	OK	-7	Ineffective
3	0114NSPSLL00287	7/27/2011	282	7/27/2011	7/27/2011	261	0	0	OK	OK	-21	Ineffective
4	0114NSPSLL00330	7/27/2011	285	7/27/2011	7/27/2011	247	0	0	OK	OK	-38	Ineffective
5	0116NSPSLL00286	7/13/2011	412	7/13/2011	7/13/2011	175	0	0	OK	OK	-237	Effective
6	0122HONGV00526	7/12/2011	338	7/12/2011	7/12/2011	278	0	0	OK	OK	-60	Ineffective
7	0123CR1GV00377	7/27/2011	276	7/27/2011	7/27/2011	282	0	0	OK	OK	6	Ineffective
8	0123CR1GV00765	7/28/2011	332	7/28/2011	7/28/2011	325	0	0	OK	OK	-7	Ineffective
9	0212NSPSGV00050	7/20/2011	264	7/20/2011	7/20/2011	87	0	0	OK	OK	-177	Effective
10	0212NSPSGV00096	7/20/2011	227	7/20/2011	7/20/2011	205	0	0	OK	OK	-22	Ineffective
11	0212NSPSLL01168	7/19/2011	466	7/19/2011	7/19/2011	229	0	0	OK	OK	-237	Ineffective
12	0217NSPSLL00345	7/6/2011	233	7/6/2011	7/6/2011	15	0	0	OK	OK	-218	Effective
13	0217NSPSLL00609	7/8/2011	204	7/8/2011	7/8/2011	237	0	0	OK	OK	33	Ineffective
14	0228NSPSLL00086	7/5/2011	466	7/5/2011	7/5/2011	253	0	0	OK	OK	-213	Ineffective
15	0228NSPSLL00590	7/5/2011	450	7/5/2011	7/5/2011	239	0	0	OK	OK	-211	Ineffective
16	0331NSPSGV00050	7/21/2011	222	7/21/2011	7/21/2011	190	0	0	OK	OK	-32	Effective
17	0331NSPSGV00110	7/19/2011	404	7/19/2011	7/19/2011	403	0	0	OK	OK	-1	Ineffective
18	0331NSPSLL00215	7/25/2011	479	7/25/2011	7/25/2011	503	0	0	OK	OK	24	Worsen
19	0331NSPSLL00247	7/26/2011	236	7/26/2011	7/26/2011	246	0	0	OK	OK	10	Ineffective
20	0331NSPSLL00250	7/26/2011	414	7/26/2011	7/26/2011	514	0	0	OK	OK	100	Worsen
21	0331NSPSLL00282	7/26/2011	436	7/26/2011	7/26/2011	435	0	0	OK	OK	-1	Ineffective
22	0331NSPSLL00980	7/22/2011	298	7/22/2011	7/22/2011	195	0	0	OK	OK	-103	Effective
23	0331NSPSLL01006	7/21/2011	235	7/21/2011	7/21/2011	108	0	0	OK	OK	-127	Effective
24	0331NSPSLL01045	7/20/2011	251	7/20/2011	7/20/2011	435	0	0	OK	OK	184	Ineffective
25	0331NSPSLL01281	7/25/2011	481	7/25/2011	7/25/2011	74	0	0	OK	OK	-407	Effective
26	0331NSPSLL01794	7/27/2011	440	7/27/2011	7/27/2011	701	0	0	OK	OK	261	Worsen
27	0331NSPSLL02669	7/19/2011	400	7/19/2011	7/19/2011	258	0	0	OK	OK	-142	Ineffective
28	16328	7/21/2011	492	7/21/2011	7/21/2011	457	0	0	OK	OK	-35	Ineffective
29	0333HONLL00099	7/15/2011	233	7/15/2011	7/15/2011	160	0	0	OK	OK	-73	Effective

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No.	Tag Number	Initial Reading		Initial Repair Attempt	Post Attempt Reading		Repair Date Gap	Remonitor Date Gap	Repair Timeliness (OK if ≤ 5)	Remonitor Timeliness (OK if ≤ 5)	Post - Initial Reading	Category
		Date	PPM	Date	Date	PPM						
30	0333HONLL00197	7/15/2011	378	7/15/2011	7/15/2011	414	0	0	OK	OK	36	Ineffective
31	0333NSPSLL00024	7/15/2011	400	7/15/2011	7/15/2011	232	0	0	OK	OK	-168	Ineffective
32	0337HONLL00075	7/8/2011	271	7/8/2011	7/8/2011	448	0	0	OK	OK	177	Ineffective
33	0338HONLL00264	7/7/2011	201	7/7/2011	7/7/2011	484	0	0	OK	OK	283	Ineffective
34	0114NSPSLL00130	8/5/2011	244	8/5/2011	8/5/2011	216	0	0	OK	OK	-28	Ineffective
35	0114NSPSLL00287	8/9/2011	306	8/9/2011	8/9/2011	246	0	0	OK	OK	-60	Ineffective
36	0123CR1GV00354	8/18/2011	463	8/18/2011	8/18/2011	443	0	0	OK	OK	-20	Ineffective
37	0123CR1LL00473	8/10/2011	434	8/10/2011	8/10/2011	407	0	0	OK	OK	-27	Ineffective
38	16907	8/3/2011	213	8/3/2011	8/3/2011	272	0	0	OK	OK	59	Ineffective
39	0228NSPSLL00134	8/2/2011	415	8/2/2011	8/2/2011	488	0	0	OK	OK	73	Ineffective
40	0228NSPSLL00147	8/2/2011	410	8/2/2011	8/2/2011	461	0	0	OK	OK	51	Ineffective
41	0228NSPSLL00641	8/1/2011	461	8/1/2011	8/1/2011	200	0	0	OK	OK	-261	Effective
42	0228NSPSLL00655	8/5/2011	473	8/5/2011	8/5/2011	136	0	0	OK	OK	-337	Effective
43	0331NSPSLL00208	8/5/2011	203	8/5/2011	8/5/2011	260	0	0	OK	OK	57	Ineffective
44	0331NSPSLL00342	8/5/2011	324	8/5/2011	8/5/2011	424	0	0	OK	OK	100	Ineffective
45	0331NSPSLL01138	8/9/2011	260	8/9/2011	8/9/2011	96	0	0	OK	OK	-164	Effective
46	0331NSPSLL01279	8/9/2011	461	8/9/2011	8/9/2011	214	0	0	OK	OK	-247	Ineffective
47	0331NSPSLL01575	8/9/2011	495	8/9/2011	8/9/2011	163	0	0	OK	OK	-332	Effective
48	0334NSPSLL00117	8/18/2011	207	8/18/2011	8/18/2011	207	0	0	OK	OK	0	Ineffective
49	0334NSPSLL00241	8/17/2011	212	8/17/2011	8/17/2011	111	0	0	OK	OK	-101	Effective
50	0335NSPSLL00168	8/10/2011	238	8/10/2011	8/10/2011	2053	0	0	OK	OK	1815	Worsen
51	3350174	8/12/2011	215	8/12/2011	8/12/2011	233	0	0	OK	OK	18	Ineffective
52	0430NSPSLL00038	8/12/2011	252	8/12/2011	8/12/2011	130	0	0	OK	OK	-122	Effective
53	15845	8/17/2011	309	8/17/2011	8/17/2011	307	0	0	OK	OK	-2	Ineffective
54	0102NSPSGV00378	9/6/2011	324	9/6/2011	9/6/2011	129	0	0	OK	OK	-195	Effective
55	0102NSPSGV00382	9/6/2011	392	9/6/2011	9/6/2011	112	0	0	OK	OK	-280	Effective
56	0102NSPSGV00832	9/1/2011	219	9/1/2011	9/1/2011	280	0	0	OK	OK	61	Ineffective
57	0102NSPSLL00429	9/7/2011	208	9/7/2011	9/7/2011	9	0	0	OK	OK	-199	Effective
58	0102NSPSLL00886	9/8/2011	275	9/8/2011	9/8/2011	1174	0	0	OK	OK	899	Worsen
59	0102NSPSLL01082	9/9/2011	263	9/9/2011	9/9/2011	141	0	0	OK	OK	-122	Effective
60	0103NSPSGV00069	9/6/2011	279	9/6/2011	9/6/2011	56	0	0	OK	OK	-223	Effective
61	0103NSPSLL00018	9/6/2011	237	9/6/2011	9/6/2011	211	0	0	OK	OK	-26	Ineffective
62	0103NSPSLL00073	9/1/2011	227	9/1/2011	9/1/2011	157	0	0	OK	OK	-70	Effective
63	0103NSPSLL00310	9/2/2011	235	9/2/2011	9/2/2011	344	0	0	OK	OK	109	Ineffective
64	0103NSPSLL00324	9/2/2011	221	9/2/2011	9/2/2011	285	0	0	OK	OK	64	Ineffective

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65	0108NSPSGV00502	9/19/2011	269	9/19/2011	9/19/2011	72	0	0	OK	OK	-197	Effective
66	0112NSPSGV00099	9/19/2011	398	9/19/2011	9/19/2011	92	0	0	OK	OK	-306	Effective
67	0113NSPSGV00535	9/14/2011	262	9/14/2011	9/14/2011	513	0	0	OK	OK	251	Worsen
68	0113NSPSGV00557	9/14/2011	211	9/14/2011	9/14/2011	622	0	0	OK	OK	411	Worsen
69	0113NSPSGV00577	9/14/2011	252	9/14/2011	9/14/2011	81	0	0	OK	OK	-171	Effective
70	0113NSPSGV00601	9/29/2011	330	9/29/2011	9/29/2011	336	0	0	OK	OK	6	Ineffective
71	0114NSPSGV00396	9/15/2011	227	9/15/2011	9/15/2011	82	0	0	OK	OK	-145	Effective
72	0114NSPSLL00316	9/9/2011	223	9/9/2011	9/9/2011	32	0	0	OK	OK	-191	Effective
73	0212NSPSGV00038	9/15/2011	325	9/15/2011	9/15/2011	20	0	0	OK	OK	-305	Effective
74	0212NSPSGV00096	9/15/2011	275	9/15/2011	9/15/2011	298	0	0	OK	OK	23	Ineffective
75	0212NSPSGV00108	9/12/2011	416	9/12/2011	9/12/2011	360	0	0	OK	OK	-56	Ineffective
76	0212NSPSGV00127	9/6/2011	411	9/6/2011	9/6/2011	380	0	0	OK	OK	-31	Ineffective
77	0212NSPSGV00207	9/13/2011	318	9/13/2011	9/13/2011	104	0	0	OK	OK	-214	Effective
78	0212NSPSLL00650	9/12/2011	447	9/12/2011	9/12/2011	49	0	0	OK	OK	-398	Effective
79	15524	9/19/2011	362	9/19/2011	9/19/2011	291	0	0	OK	OK	-71	Ineffective
80	0217NSPSLL00487	9/28/2011	494	9/28/2011	9/28/2011	245	0	0	OK	OK	-249	Ineffective
81	0228NSPSLL00630	9/1/2011	216	9/1/2011	9/1/2011	242	0	0	OK	OK	26	Ineffective
82	0228NSPSLL00721	9/6/2011	206	9/6/2011	9/6/2011	97	0	0	OK	OK	-109	Effective
83	0228NSPSLL00915	9/1/2011	495	9/1/2011	9/1/2011	266	0	0	OK	OK	-229	Ineffective
84	0331NSPSLL00339	9/7/2011	273	9/7/2011	9/7/2011	124	0	0	OK	OK	-149	Effective
85	0331NSPSLL01213	9/1/2011	492	9/1/2011	9/1/2011	401	0	0	OK	OK	-91	Ineffective
86	0338HONLL00270	9/13/2011	489	9/13/2011	9/13/2011	440	0	0	OK	OK	-49	Ineffective
87	0122NSPSLL00041	10/18/2011	379	10/18/2011	10/18/2011	481	0	0	OK	OK	102	Ineffective
88	0122NSPSLL00087	10/13/2011	204	10/13/2011	10/13/2011	187	0	0	OK	OK	-17	Effective
89	14863	10/20/2011	354	10/20/2011	10/20/2011	197	0	0	OK	OK	-157	Effective
90	0331HONLL00537	10/24/2011	370	10/24/2011	10/24/2011	140	0	0	OK	OK	-230	Effective
91	0331HONLL00630	10/7/2011	271	10/7/2011	10/7/2011	421	0	0	OK	OK	150	Ineffective
92	0331HONLL00651	10/7/2011	216	10/7/2011	10/7/2011	224	0	0	OK	OK	8	Ineffective
93	0331HONLL00768	10/26/2011	260	10/26/2011	10/26/2011	121	0	0	OK	OK	-139	Effective
94	0331HONLL00839	10/5/2011	278	10/5/2011	10/5/2011	167	0	0	OK	OK	-111	Effective
95	0331NSPSGV00110	10/6/2011	248	10/6/2011	10/6/2011	244	0	0	OK	OK	-4	Ineffective
96	0331NSPSLL00042	10/10/2011	392	10/10/2011	10/10/2011	88	0	0	OK	OK	-304	Effective
97	0331NSPSLL00046	10/10/2011	210	10/10/2011	10/10/2011	446	0	0	OK	OK	236	Ineffective
98	0331NSPSLL00127	10/24/2011	263	10/24/2011	10/24/2011	258	0	0	OK	OK	-5	Ineffective
99	0331NSPSLL00203	10/25/2011	422	10/25/2011	10/25/2011	140	0	0	OK	OK	-282	Effective

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No.	Tag Number	Initial Reading		Initial Repair Attempt	Post Attempt Reading		Repair Date Gap	Remonitor Date Gap	Repair Timeliness (OK if ≤ 5)	Remonitor Timeliness (OK if ≤ 5)	Post - Initial Reading	Category
		Date	PPM	Date	Date	PPM						
100	0331NSPSLL00282	10/27/2011	243	10/27/2011	10/27/2011	273	0	0	OK	OK	30	Ineffective
101	0331NSPSLL00343	10/27/2011	229	10/27/2011	10/27/2011	277	0	0	OK	OK	48	Ineffective
102	0331NSPSLL00365	10/24/2011	291	10/24/2011	10/24/2011	267	0	0	OK	OK	-24	Ineffective
103	0331NSPSLL00389	10/24/2011	277	10/24/2011	10/24/2011	250	0	0	OK	OK	-27	Ineffective
104	0331NSPSLL00561	10/21/2011	256	10/21/2011	10/21/2011	235	0	0	OK	OK	-21	Ineffective
105	0331NSPSLL00748	10/18/2011	284	10/18/2011	10/18/2011	231	0	0	OK	OK	-53	Ineffective
106	0331NSPSLL00777	10/21/2011	217	10/21/2011	10/21/2011	224	0	0	OK	OK	7	Ineffective
107	0331NSPSLL00851	10/10/2011	281	10/10/2011	10/10/2011	72	0	0	OK	OK	-209	Effective
108	0331NSPSLL00881	10/10/2011	243	10/10/2011	10/10/2011	254	0	0	OK	OK	11	Ineffective
109	0331NSPSLL00917	10/18/2011	200	10/18/2011	10/18/2011	21	0	0	OK	OK	-179	Effective
110	0331NSPSLL00922	10/21/2011	204	10/21/2011	10/21/2011	181	0	0	OK	OK	-23	Effective
111	0331NSPSLL01021	10/6/2011	477	10/6/2011	10/6/2011	243	0	0	OK	OK	-234	Ineffective
112	0331NSPSLL01053	10/4/2011	228	10/4/2011	10/4/2011	364	0	0	OK	OK	136	Ineffective
113	0331NSPSLL01056	10/6/2011	279	10/6/2011	10/6/2011	284	0	0	OK	OK	5	Ineffective
114	0331NSPSLL01187	10/4/2011	331	10/4/2011	10/4/2011	229	0	0	OK	OK	-102	Ineffective
115	0331NSPSLL01417	10/4/2011	412	10/4/2011	10/4/2011	309	0	0	OK	OK	-103	Ineffective
116	0331NSPSLL01608	10/4/2011	382	10/4/2011	10/4/2011	286	0	0	OK	OK	-96	Ineffective
117	0331NSPSLL01638	10/28/2011	326	10/28/2011	10/28/2011	202	0	0	OK	OK	-124	Ineffective
118	0331NSPSLL01699	10/27/2011	261	10/27/2011	10/27/2011	237	0	0	OK	OK	-24	Ineffective
119	0331NSPSLL02042	10/24/2011	450	10/24/2011	10/24/2011	320	0	0	OK	OK	-130	Ineffective
120	0331NSPSLL02082	10/28/2011	430	10/28/2011	10/28/2011	401	0	0	OK	OK	-29	Ineffective
121	0331NSPSLL02392	10/27/2011	370	10/27/2011	10/27/2011	329	0	0	OK	OK	-41	Ineffective
122	0331NSPSLL02536	10/18/2011	296	10/18/2011	10/18/2011	217	0	0	OK	OK	-79	Ineffective
123	0331NSPSLL02615	10/25/2011	369	10/25/2011	10/25/2011	65	0	0	OK	OK	-304	Effective
124	0331NSPSLL02635	10/6/2011	231	10/6/2011	10/6/2011	268	0	0	OK	OK	37	Ineffective
125	0331NSPSLL02637	10/4/2011	263	10/4/2011	10/4/2011	408	0	0	OK	OK	145	Ineffective
126	0331NSPSLL02703	10/21/2011	473	10/21/2011	10/21/2011	426	0	0	OK	OK	-47	Ineffective
127	0331NSPSLL02708	10/21/2011	463	10/21/2011	10/21/2011	268	0	0	OK	OK	-195	Ineffective
128	0331NSPSLL03136	10/28/2011	245	10/28/2011	10/28/2011	154	0	0	OK	OK	-91	Effective
129	0335NSPSLL00149	10/5/2011	242	10/5/2011	10/5/2011	160	0	0	OK	OK	-82	Effective
130	0338HONLL00020	10/25/2011	410	10/25/2011	10/25/2011	442	0	0	OK	OK	32	Ineffective
131	0338HONLL00047	10/25/2011	203	10/25/2011	10/25/2011	66	0	0	OK	OK	-137	Effective
132	0338HONLL00143	10/26/2011	280	10/26/2011	10/26/2011	39	0	0	OK	OK	-241	Effective
133	0338HONLL00149	10/26/2011	235	10/26/2011	10/26/2011	57	0	0	OK	OK	-178	Effective
134	0338HONLL00206	10/26/2011	452	10/26/2011	10/26/2011	220	0	0	OK	OK	-232	Ineffective

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No.	Tag Number	Initial Reading Date	Initial Reading PPM	Initial Repair Attempt Date	Post Attempt Reading Date	Post Attempt Reading PPM	Repair Date Gap	Remonitor Date Gap	Repair Timeliness (OK if ≤ 5)	Remonitor Timeliness (OK if ≤ 5)	Post - Initial Reading	Category
135	0338NSPSLL00038	10/25/2011	446	10/25/2011	10/25/2011	270	0	0	OK	OK	-176	Ineffective
136	0338NSPSLL00104	10/25/2011	466	10/25/2011	10/25/2011	355	0	0	OK	OK	-111	Ineffective
137	0590NSPSGV00155	10/5/2011	228	10/5/2011	10/5/2011	208	0	0	OK	OK	-20	Ineffective
138	0590NSPSGV00204	10/5/2011	316	10/5/2011	10/5/2011	860	0	0	OK	OK	544	Worsen
139	401543	11/14/2011	204	11/14/2011	11/14/2011	5	0	0	OK	OK	-199	Effective
140	0113NSPSGV00579	11/3/2011	375	11/3/2011	11/3/2011	6	0	0	OK	OK	-369	Effective
141	0118NSPSLL00063	11/15/2011	399	11/15/2011	11/15/2011	168	0	0	OK	OK	-231	Effective
142	0118NSPSLL00187	11/16/2011	338	11/16/2011	11/16/2011	19	0	0	OK	OK	-319	Effective
143	0118NSPSLL00456	11/16/2011	280	11/16/2011	11/16/2011	319	0	0	OK	OK	39	Ineffective
144	0118NSPSLL00536	11/16/2011	274	11/16/2011	11/16/2011	394	0	0	OK	OK	120	Ineffective
145	0118NSPSLL00720	11/17/2011	402	11/17/2011	11/17/2011	16	0	0	OK	OK	-386	Effective
146	403647	11/19/2011	208	11/19/2011	11/19/2011	200	0	0	OK	OK	-8	Effective
147	403657	11/19/2011	220	11/19/2011	11/19/2011	225	0	0	OK	OK	5	Ineffective
148	0122HONGV00255	11/22/2011	420	11/22/2011	11/22/2011	117	0	0	OK	OK	-303	Effective
149	0122HONLL01061	11/22/2011	432	11/22/2011	11/22/2011	59	0	0	OK	OK	-373	Effective
150	0123CR1GV00133	11/21/2011	300	11/21/2011	11/21/2011	263	0	0	OK	OK	-37	Ineffective
151	0123CR1GV00277	11/18/2011	223	11/18/2011	11/18/2011	52	0	0	OK	OK	-171	Effective
152	0123CR1GV00302	11/21/2011	261	11/21/2011	11/21/2011	218	0	0	OK	OK	-43	Ineffective
153	0123CR1GV00415	11/29/2011	339	11/29/2011	11/29/2011	246	0	0	OK	OK	-93	Ineffective
154	0123CR1GV00454	11/19/2011	211	11/19/2011	11/19/2011	252	0	0	OK	OK	41	Ineffective
155	0123CR1LL00357	11/17/2011	289	11/17/2011	11/17/2011	290	0	0	OK	OK	1	Ineffective
156	0123CR1LL00539	11/28/2011	204	11/28/2011	11/28/2011	159	0	0	OK	OK	-45	Effective
157	0123CR1LL00947	11/22/2011	250	11/22/2011	11/22/2011	216	0	0	OK	OK	-34	Ineffective
158	0125NSPSGV00170	11/14/2011	363	11/14/2011	11/14/2011	314	0	0	OK	OK	-49	Ineffective
159	0125NSPSGV00415	11/11/2011	276	11/11/2011	11/11/2011	253	0	0	OK	OK	-23	Ineffective
160	0228NSPSLL00058	11/7/2011	265	11/7/2011	11/7/2011	180	0	0	OK	OK	-85	Effective
161	0228NSPSLL00067	11/7/2011	415	11/7/2011	11/7/2011	328	0	0	OK	OK	-87	Ineffective
162	0228NSPSLL00076	11/7/2011	319	11/7/2011	11/7/2011	306	0	0	OK	OK	-13	Ineffective
163	0228NSPSLL00122	11/4/2011	377	11/4/2011	11/4/2011	311	0	0	OK	OK	-66	Ineffective
164	0228NSPSLL00134	11/4/2011	336	11/4/2011	11/4/2011	483	0	0	OK	OK	147	Ineffective
165	0228NSPSLL00310	11/3/2011	457	11/3/2011	11/3/2011	357	0	0	OK	OK	-100	Ineffective
166	0228NSPSLL00399	11/7/2011	348	11/7/2011	11/7/2011	255	0	0	OK	OK	-93	Ineffective
167	0228NSPSLL00602	11/4/2011	293	11/4/2011	11/4/2011	281	0	0	OK	OK	-12	Ineffective
168	0228NSPSLL00623	11/7/2011	287	11/7/2011	11/7/2011	396	0	0	OK	OK	109	Ineffective
169	0228NSPSLL00629	11/7/2011	388	11/7/2011	11/7/2011	286	0	0	OK	OK	-102	Ineffective

ATTACHMENT 9, Appendix D
Initial Repair Attempt Details
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No.	Tag Number	Initial Reading Date	Initial Reading PPM	Initial Repair Attempt Date	Post Attempt Reading Date	Post Attempt Reading PPM	Repair Date Gap	Remonitor Date Gap	Repair Timeliness (OK if ≤ 5)	Remonitor Timeliness (OK if ≤ 5)	Post - Initial Reading	Category
170	0228NSPSLL00650	11/7/2011	499	11/7/2011	11/7/2011	447	0	0	OK	OK	-52	Ineffective
171	0228NSPSLL00795	11/8/2011	364	11/8/2011	11/8/2011	95	0	0	OK	OK	-269	Effective
172	0228NSPSLL00915	11/2/2011	307	11/2/2011	11/2/2011	280	0	0	OK	OK	-27	Ineffective
173	0228NSPSLL01068	11/8/2011	315	11/8/2011	11/8/2011	363	0	0	OK	OK	48	Ineffective
174	0331HONLL00806	11/2/2011	494	11/2/2011	11/2/2011	268	0	0	OK	OK	-226	Ineffective
175	0331HONLL00827	11/2/2011	257	11/2/2011	11/2/2011	975	0	0	OK	OK	718	Worsen
176	0331NSPSLL01143	11/1/2011	240	11/1/2011	11/1/2011	781	0	0	OK	OK	541	Worsen
177	0331NSPSLL01568	11/2/2011	420	11/2/2011	11/2/2011	206	0	0	OK	OK	-214	Ineffective
178	0331NSPSLL02669	11/1/2011	487	11/1/2011	11/1/2011	220	0	0	OK	OK	-267	Ineffective
179	0334NSPSLL00222	11/23/2011	381	11/23/2011	11/23/2011	422	0	0	OK	OK	41	Ineffective
180	120511	11/21/2011	444	11/21/2011	11/21/2011	421	0	0	OK	OK	-23	Ineffective
181	0102NSPSGV00175	12/12/2011	228	12/12/2011	12/12/2011	286	0	0	OK	OK	58	Ineffective
182	0113NSPSGV00229	12/20/2011	220	12/20/2011	12/20/2011	34	0	0	OK	OK	-186	Effective
183	0113NSPSGV00577	12/15/2011	252	12/15/2011	12/15/2011	67	0	0	OK	OK	-185	Effective
184	0114NSPSLL00057	12/8/2011	484	12/8/2011	12/8/2011	32	0	0	OK	OK	-452	Effective
185	0114NSPSLL00320	12/8/2011	455	12/8/2011	12/8/2011	937	0	0	OK	OK	482	Worsen
186	0116NSPSGV00228	12/21/2011	482	12/21/2011	12/21/2011	106	0	0	OK	OK	-376	Effective
187	0116NSPSGV00294	12/23/2011	431	12/23/2011	12/23/2011	308	0	0	OK	OK	-123	Ineffective
188	0116NSPSGV00521	12/21/2011	282	12/21/2011	12/21/2011	100000	0	0	OK	OK	99718	Worsen
189	0116NSPSGV00543	12/21/2011	258	12/21/2011	12/21/2011	14	0	0	OK	OK	-244	Effective
190	0116NSPSGV00711	12/16/2011	214	12/16/2011	12/16/2011	30	0	0	OK	OK	-184	Effective
191	0116NSPSGV00756	12/19/2011	357	12/19/2011	12/19/2011	776	0	0	OK	OK	419	Worsen
192	0116NSPSLL00126	12/19/2011	215	12/19/2011	12/19/2011	126	0	0	OK	OK	-89	Effective
193	0116NSPSLL00267	12/19/2011	296	12/19/2011	12/19/2011	61	0	0	OK	OK	-235	Effective
194	0116NSPSLL00286	12/21/2011	220	12/21/2011	12/21/2011	49	0	0	OK	OK	-171	Effective
195	0212NSPSGV00052	12/6/2011	409	12/6/2011	12/6/2011	315	0	0	OK	OK	-94	Ineffective
196	0212NSPSGV00177	12/6/2011	397	12/6/2011	12/6/2011	37	0	0	OK	OK	-360	Effective
197	0212NSPSGV00194	12/20/2011	377	12/20/2011	12/20/2011	125	0	0	OK	OK	-252	Effective
198	0212NSPSGV00204	12/6/2011	359	12/6/2011	12/6/2011	142	0	0	OK	OK	-217	Effective
199	0212NSPSGV00215	12/7/2011	214	12/7/2011	12/7/2011	318	0	0	OK	OK	104	Ineffective
200	0212NSPSLL00367	12/5/2011	234	12/5/2011	12/5/2011	694	0	0	OK	OK	460	Worsen
201	0212NSPSLL00407	12/22/2011	471	12/22/2011	12/22/2011	23	0	0	OK	OK	-448	Effective
202	0212NSPSLL00535	12/27/2011	211	12/27/2011	12/27/2011	1529	0	0	OK	OK	1318	Worsen
203	0212NSPSLL00915	12/5/2011	357	12/5/2011	12/5/2011	155	0	0	OK	OK	-202	Effective
204	0212NSPSLL00930	12/5/2011	212	12/5/2011	12/5/2011	153	0	0	OK	OK	-59	Effective

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No.	Tag Number	Initial Reading		Initial Repair Attempt	Post Attempt Reading		Repair Date Gap	Remonitor Date Gap	Repair Timeliness (OK if ≤ 5)	Remonitor Timeliness (OK if ≤ 5)	Post - Initial Reading	Category
		Date	PPM	Date	Date	PPM						
205	0331NSPSGV00104	12/6/2011	319	12/6/2011	12/6/2011	921	0	0	OK	OK	602	Worsen
206	0331NSPSLL01611	12/2/2011	285	12/2/2011	12/2/2011	229	0	0	OK	OK	-56	Ineffective
207	0331NSPSLL01794	12/2/2011	269	12/2/2011	12/2/2011	863	0	0	OK	OK	594	Worsen

ATTACHMENT 9, Appendix E
Internal Leak Definition Repair Information
[130(b)(ix)]

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Pumps (in light liqud service) and Valves (in light liquid and/or gas vapor service, and other than pressure relief devices) with no intial repair attempt and/or re-monitoring and at Internal Leak Threshold within 5 days

Compliance Group	Tag	Class	Date Reported	First Attempt Due Date	Initial Repair Date	Initial Retest Date	Issue	Note
No Pumps (in light liqud service) and Valves (in light liquid and/or gas vapor service, and other than pressure relief devices) leaking at the Internal Leak Threshold had no intial repair attempt and/or re-monitoring within 5 days								

Pumps (in light liquid service) and Valves (in light liquid and/or gas-vapor service, and other than pressure relief devices) leaking above internal threshold not repaired within 30 days or placed on Delay of Repair List

Compliance Group	Tag	Class	Date Reported	Effective Repair Due Date	Actual Repair Date		Issue	Note
No Pumps (in light liquid service) and Valves (in light liquid and/or gas-vapor service, and other than pressure relief devices) leaking above Internal Leak Threshold were not, within 30 days, repaired or placed on the Delay of Repair list or removed from service.								

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LDAR Audit Findings, Corrective Actions, and Status
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3rd Party LDAR Audit Issues

The audit was started on June 6th but not completed until July 21st due to unit accessability. Thus, the audit report findings are included in this 2H2011 semi-annual report.

Finding No.	Priority	Regulatory Citation	Unit	Findings	Suggested Corrective Action	Corrective Action	Responsible Party	Actual Completion Date
1	4	**Consent Decree** Section M, Paragraph 117 of the Consent Decree: Refinery-wide LDAR audits shall include component identification procedures, tagging procedures.	114/116/590	The audit team observed four (4) valves in light liquid (LL) service during the field evaluation of three process units that the refinery verified were not accounted for in the Leak Detection and Repair Program (i.e., no documentation of the date they were added and no monitoring history). The two components in Unit 116 (i.e., the valve adjacent to LL0270 and the valve near valve LL00391 at a sample station) were reported by LDAR personnel to be less than 30 days old based on observation by LDAR personnel. The valve in Unit 114 (adjacent to LL00299) was tagged in the field, but was not present in the LDAR database (i.e., had no monitoring history). The valve in Unit 590 (adjacent to LL00365) appeared temporary based on discussions with operations and the presence of a replacement flange, but the date it was placed in service could not be confirmed as being less than 30 days.	Continue to verify in the field that piping components in light liquid or gas/vapor service are tagged, documented in the LDAR database and monitored in accordance with the refinery's LDAR program. Each of these four (4) valves has been tagged and monitored prior to the completion of the audit.	All components were corrected.	LDAR Coordinator, LDAR Contractor	June 17, 2011

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Finding No.	Priority	Regulatory Citation	Unit	Findings	Suggested Corrective Action	Corrective Action	Responsible Party	Actual Completion Date
2	3	**Regulatory** 40 CFR §60.482-6 (a)(1) Each open-ended valve or line shall be equipped with a cap, blind flange, plug, or a second valve, except as provided in §60.482–1(c) and paragraphs (d) and (e) of this section. (2) The cap, blind flange, plug, or second valve shall seal the open end at all times except during operations requiring process fluid flow through the open-ended valve or line. 35 IAC 218.451 Sealing Device Requirements. Except for safety pressure relief valves, no owner or operator of a petroleum refinery shall install or operate a valve at the end of a pipe or line containing VOMs unless the pipe or line is sealed with a second valve, blind flange, plug, cap or other sealing device. The sealing device may be removed only when a sample is being taken or during maintenance operations.	114/116	Three open-ended lines were observed during field walkthroughs and comparative monitoring within three refinery process units. The OEL in Unit 114 (after LL00304) was an uncapped line equipped with two upstream valves before it, but a high (>500) ppm reading was observed at the end of the open-ended line that indicated that the open-ended line was not sealed by the second valve. The two other OELs were associated with a methanol tote tank in Unit 116.	Address the identified OELs. Conduct awareness training for operations and LDAR monitoring personnel. Each of these three (3) open-ended lines were equipped with a cap, blind flange, plug, or a second valve prior to the completion of the audit.	The possible OEL found in unit 114 (after LL00304) was verified by Operations to have been double valved. --- The two OEL found in unit 116 were plugged by Operations.	Operations	June 15/2011 --- July 13, 2011
3	4	**Regulatory** 40 CFR §60.482-7(b)(3) Any valve for which a leak is not detected for 2 successive months may be monitored the first month of every quarter, beginning with the next quarter, until a leak is detected. (2) If a leak is detected, the valve shall be monitored monthly until a leak is not detected for 2 successive months.		Records indicated that the refinery did not conduct follow-up monitoring of one repaired valve for two successive months after repair, following a process unit turnaround.	Continue to reconcile scheduled monitoring events at the end of each month and each quarter to identify if components have not been monitored according to their scheduled frequencies.	No corrective action to be taken for the specific component. A routine QA to ensure follow up monitoring will be implemented.	LDAR Coordinator	June 9, 2011

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Finding No.	Priority	Regulatory Citation	Unit	Findings	Suggested Corrective Action	Corrective Action	Responsible Party	Actual Completion Date
4	3	**Regulatory** 40 CFR 60, Appendix A - Method 21, Section 8.3.1.3: Valves. The most common source of leaks from valves is the seal between the stem and housing. Place the probe at the interface where the stem exits the packing gland and sample the stem circumference. Also, place the probe at the interface of the packing gland take-up flange seat and sample the periphery. In addition, survey valve housings of multipart assembly at the surface of all interfaces where a leak could occur.		During these observations, the audit team observed two technicians not monitor at significant interfaces where leaks could occur that require monitoring per Method 21. In particular, one technician did not monitor the ball valve stem interface and one technician did not monitor the injection port on a gate valve (i.e., within the valve housing).	Provide refresher training to LDAR monitoring technicians on EPA Method 21 monitoring requirements, emphasizing equipment leak interfaces to monitor.	Re-training of monitoring for technicians was conducted by contractor.	LDAR Contractor	June 10, 2011
5	3	**Regulatory** 40 CFR 60, Appendix A - Method 21, Section 8.1.2: Calibration Precision. The calibration precision test must be completed prior to placing the analyzer into service and at subsequent 3-month intervals or at the next use, whichever is later. 8.1.3 Response Time. The response time test is required before placing the instrument into service. If a modification to the sample pumping system or flow configuration is made that would change the response time, a new test is required before further use.		The refinery's calibration precision records did not document that a separate response time test had been conducted for the refinery's 10-foot extension probe configuration.	Revise the performance test procedure and LDAR written program to include an extension probe for each instrument prior to placing any instrument into service initially or following instrument maintenance.	The 10ft extension response time was added to the Quarterly Calibration form. Next Quarterly Calibration to occurr 10/3/2011.	LDAR Coordinator	August 29, 2011
6	4	**Regulatory** 40 CFR 60 Appendix A - Method 21, Section 6.5: The instrument shall be equipped with a probe or probe extension for sampling not to exceed 6.4 mm (1/4 in) in outside diameter, with a single end opening for admission of sample.		While monitoring rotating equipment, the LDAR technicians utilize a flexible tubing on the probe tip with an outside diameter that exceeds 1/4 inch.	Utilize a smaller gauge flexible tubing that meets the Method 21 outside diameter limits.	The material was changed. The tip is only used on the seal of a pump where there is more than adequate room to use the plastic tip.	LDAR Coordinator, LDAR Contractor	June 16, 2011

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Finding No.	Priority	Regulatory Citation	Unit	Findings	Suggested Corrective Action	Corrective Action	Responsible Party	Actual Completion Date
7	4	**Consent Decree** Section M, Paragraph 122 of the Consent Decree. Initial Attempt at Repair of Valves. Beginning no later than September 30, 2005, at the Lake Charles, Lemont, Corpus Christi East, Corpus Christi West and Paulsboro Refineries and beginning no later than December 31, 2006, at the Savannah Refinery, CITGO shall make an "initial attempt" to repair any valve at any Covered Refinery that has a reading greater than 200 ppm of VOCs, excluding pressure relief devices, control valves and components that LDAR personnel are not authorized to repair. CITGO or its designated contractor shall make this "initial attempt" at repair and remonitor the leak within five (5) days of identification.		An analysis of historical monitoring data identified two instances where a technician set the background concentration of his monitoring instrument to a value above normal background such that the resulting net concentration measured (after subtracting that background concentration) was less than the 200-ppm repair action level. Consequently, no leak was identified, and no repairs were made. In one instance, a concentration reading measured a gross concentration of 203 ppm was recorded in the database as 145 ppm after the 94 ppm background concentration was subtracted.	Conduct refresher training for LDAR monitoring technicians on EPA Method 21 requirements and implement administrative controls to restrict adjustment of the background concentration to avoid missing leaks due to elevated background readings.	No corrective action to be taken for the specific incident. QA procedures have been initiated to review the highest background readings each day.	LDAR Coordinator, LDAR Contractor	June 10, 2011
8	2	**Consent Decree** Section M, Paragraph 129 of the Consent Decree. Chronic Leakers. CITGO shall replace, repack, or perform similarly effective repairs on chronically leaking, non-control valves during the next process unit turnaround after identification. A component shall be classified as a "chronic leaker" under this Paragraph if it leaks above 10,000 ppm twice in any consecutive four quarters, unless the component has not leaked in the twelve (12) consecutive quarters prior to the relevant process unit turnaround.		Refinery records indicated that a total of thirteen chronic leaker valves were not identified and repaired during the September 2009 turnaround for Units 120 and 212 and the September 2010 Turnaround in Unit 123.	Revise the Chronic Leaker section in the refinery's written LDAR Program Plan to identify chronic leakers to be addressed during the next relevant process unit turnaround.	Worked with LeakDAS developer to create Chronic Leak report. Chronic leaks that could be addressed without a TA were reported to Operations for replacement.	LDAR Coordinator	September 16, 2011

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Finding No.	Priority	Regulatory Citation	Unit	Findings	Suggested Corrective Action	Corrective Action	Responsible Party	Actual Completion Date
9	4	**Consent Decree** Section M, Paragraph 130 of the Consent Decree. 130. Recordkeeping and Reporting Requirements for this Section. b. In each Covered Refinery's Progress Report submitted pursuant to Section IX, CITGO shall also include the following information on LDAR monitoring: i. a list of the process units monitored during the reporting period; ii. the number of valves and pumps present in each process unit; iii. the number of valves and pumps monitored in each process unit; iv. the number of valves and pumps found leaking; v - ix. [omitted]		Attachment 9 of the refinery's semi-annual CD progress report for the 6-month period ending December 31, 2009 did not include the elements under Section 130(b)(ii)-(iv) related to number of valves and pumps present, monitored, and leaking in each of the refinery's process units for the reporting period. Previous semi-annual reports contained this information.	Use previous semi-annual reporting template to include the required information.	In the Semi-annual report submitted August 31, 2011 for reporting period January 1, 2011 - June 30, 2011, 130(b)(ii)-(iv) were included.	LDAR Coordinator	August 31, 2011
10	3	**Regulatory** 40 CFR §60.485a(b)(2): A calibration drift assessment shall be performed, at a minimum, at the end of each monitoring day. Check the instrument using the same calibration gas(es) that were used to calibrate the instrument before use. Follow the procedures specified in Method 21 of appendix A–7 of this part, Section 10.1, except do not adjust the meter readout to correspond to the calibration gas value. Record the instrument reading for each scale used as specified in §60.486a(e)(7) [sic; actually §60.486(e)(8)]. Calculate the average algebraic difference between the three meter readings and the most recent calibration value. Divide this algebraic difference by the initial calibration value and multiply by 100 to express the calibration drift as a percentage. If any calibration drift assessment shows a negative drift of more than 10 percent from the initial calibration value, then all equipment monitored since the last calibration with instrument readings below the appropriate leak		For all units, including Unit 590 that is subject to NSPS Subpart VVa, the refinery calculates the calibration drift at the end of each monitoring day using one meter reading rather than taking three readings and using the average of them.	Calculate the end of shift calibration drift assessment using both of the methods required by the CD and NSPS Subpart VVa (at least for Unit 590, the only unit subject to NSPS Subpart VVa).	Requesting ERM to submit a "white paper" to the EPA concerning this issue.	LDAR Coordinator, LDAR Contractor	September 2, 2011

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Finding No.	Priority	Regulatory Citation	Unit	Findings	Suggested Corrective Action	Corrective Action	Responsible Party	Actual Completion Date
		definition and above the leak definition multiplied by (100 minus the percent of negative drift/divided by 100) must be re-monitored. If any calibration drift assessment shows a positive drift of more than 10 percent from the initial calibration value, then, at the owner/operator's discretion, all equipment since the last calibration with instrument readings above the appropriate leak definition and below the leak definition multiplied by (100 plus the percent of positive drift/divided by 100) may be re-monitored.						

Priority Levels

Priority	Missed Monitoring	Repair Problems	Uncontrolled	Sampling Systems w/o Flushing Control	Recordkeeping Problems	Monitoring Errors	Recordkeeping Problems
1	Thousands of components	Missed 15-day on hundreds or 5-day on thousands of components	Hundreds of components	Tens of sampling systems	-	Major Systematic	---
2	Hundreds of components	Missed 15-day on tens or 5-day on hundreds of components	Tens of components	Multiple sampling systems	Major Systematic	Major Sporadic	Major Systematic
3	Tens of components	Missed 15-day on individual or 5-day on tens of components	Individual components	Individual sampling systems	Major Sporadic	Minor Systematic	Major Sporadic
4	Individual components	Missed 5-day on individual components	---	---	Minor Systematic	Minor Sporadic	Minor Systematic
5	---	---	---	---	Minor Sporadic	---	Minor Sporadic

Note: Priority levels are based on potential impact to emissions and/or impact to compliance assurance.

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Attachment 10

Emission Summary Data

Attachment 10.
Semi-Annual Emission Data
144.b.

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Emission Summary for Units Affected by Consent Decree
Jul-2011 through Dec-2011

	Tons/month						Total tons
	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	(6-mo)
FCCU							
CO	13.12	11.16	6.77	5.41	5.74	7.34	49.54
NOx	10.85	10.42	10.02	10.21	10.12	12.13	63.76
SO2	6.41	6.86	6.19	7.00	7.24	8.70	42.40
SRUs (SO2)							
119A-train	4.15	4.09	4.46	4.42	8.69	4.73	30.55
119 B-train	3.67	3.05	2.97	1.12	1.96	1.81	14.58
121 C-train	6.95	7.73	5.68	6.66	8.17	6.36	41.55
121 D-train	3.14	2.68	3.06	3.60	3.02	2.86	18.35
Total	17.92	17.55	16.17	15.80	21.84	15.76	105.03
Process Heaters (SO2)							
102 B-2	0.01	0.01	0.00	0.00	0.00	0.00	0.03
103 B-1	0.01	0.01	0.01	0.01	0.01	0.01	0.05
106 B-1	0.03	0.01	0.01	0.01	0.00	0.00	0.05
107 B-21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108 B-41	0.02	0.00	0.00	0.01	0.00	0.00	0.03
108 B-42	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109 B-62	0.03	0.01	0.04	0.07	0.01	0.00	0.16
111 B-1A	0.31	0.18	0.19	0.21	0.20	0.19	1.28
111 B-1B	0.29	0.18	0.19	0.20	0.20	0.19	1.25
111 B-2	0.16	0.09	0.10	0.11	0.10	0.10	0.66
113 B-1	0.08	0.05	0.05	0.06	0.05	0.05	0.34
113 B-2	0.08	0.05	0.05	0.05	0.05	0.05	0.33
113 B-3	0.08	0.04	0.05	0.05	0.05	0.05	0.31
114 B-1	0.01	0.00	0.00	0.01	0.01	0.00	0.03
114 B-2	0.01	0.00	0.00	0.01	0.01	0.00	0.03
114 B-3	0.01	0.00	0.00	0.00	0.00	0.00	0.02
115 B-1	0.01	0.00	0.00	0.00	0.00	0.00	0.02
115 B-2	0.01	0.00	0.00	0.00	0.00	0.00	0.03
116 B-1	0.03	0.00	0.01	0.02	0.02	0.01	0.09
116 B-2	0.02	0.00	0.00	0.01	0.01	0.00	0.05
116 B-3	0.00	0.00	0.00	0.00	0.00	0.00	0.02
116 B-4	0.01	0.00	0.00	0.00	0.00	0.00	0.02
118 B-1	0.03	0.01	0.01	0.01	0.00	0.00	0.06
118 B-51	0.00	0.00	0.00	0.00	0.00	0.00	0.01
122 B-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
122 B-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
123 B-1	0.02	0.01	0.01	0.01	0.00	0.01	0.06
123 B-2	0.12	0.05	0.04	0.03	0.03	0.04	0.31
123 B-3	0.03	0.01	0.01	0.01	0.01	0.01	0.09
123 B-4	0.03	0.01	0.01	0.01	0.01	0.01	0.08
123 B-5	0.01	0.01	0.00	0.00	0.01	0.01	0.04
125 B-1	0.02	0.00	0.01	0.02	0.02	0.01	0.08
125 B-2	0.05	0.01	0.02	0.03	0.03	0.01	0.14
590 H-1	0.01	0.00	0.01	0.01	0.01	0.00	0.04
590 H-2	0.06	0.03	0.03	0.03	0.03	0.03	0.22
430 B-1	0.20	0.01	0.01	0.09	0.07	0.15	0.52
431 B-20	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Total	1.81	0.79	0.89	1.07	0.94	0.95	6.46

Attachment 10.
Semi-Annual Emission Data
144.b.

Lemont Refinery
CITGO Petroleum Corporation
Semi-Annual Report

Emission Summary for Units Affected by Consent Decree
Jul-2011 through Dec-2011

	Tons/month						Total tons (6-mo)
	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	
Process Heaters (NOx)							
111B-1A	2.04	2.07	1.94	2.28	2.16	2.23	12.71
111B-1B	2.41	2.60	2.51	2.62	2.61	2.58	15.34
111B-2	0.84	0.83	0.85	0.90	0.83	0.92	5.17
430B-1	2.34	0.02	0.00	1.64	1.25	2.69	7.94
431B-20	1.81	3.43	3.37	2.29	2.54	2.37	15.81
Total	9.44	8.94	8.67	9.73	9.39	10.79	56.97